ENGINEERING NEWS-RECORD

JUNE 19, 1958

PRICE 50 CENTS

Second Quarterly Roundup: Construction Cost and Estimating Guide
Featuring Highway Indexes & Unit Costs p. 58

Roadbuilding Gets Rolling

- BUT is the program big enough?
- WHERE does it stand now?
- WHAT is it costing?

PLUS The latest in mechanized engineering and reports on current studies p. 37

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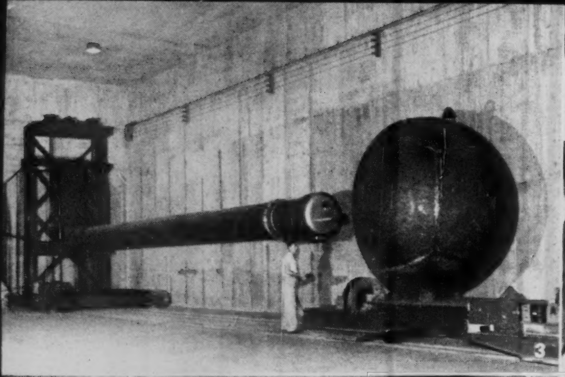

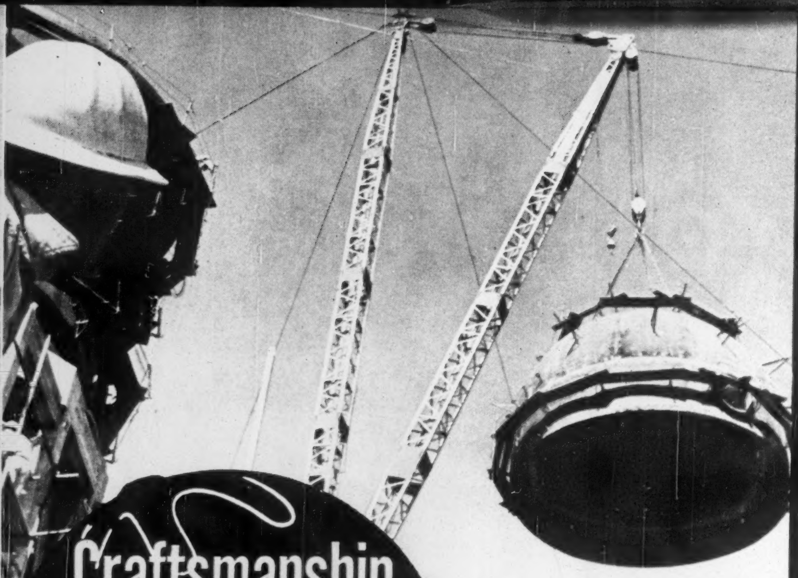

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CB&I Engineers From first contact with the customer through final testing, CB&I's general engineering staff supplies technical guidance to the CB&I team. Important coordination between fabricating, erection and testing of your structure is thus insured.

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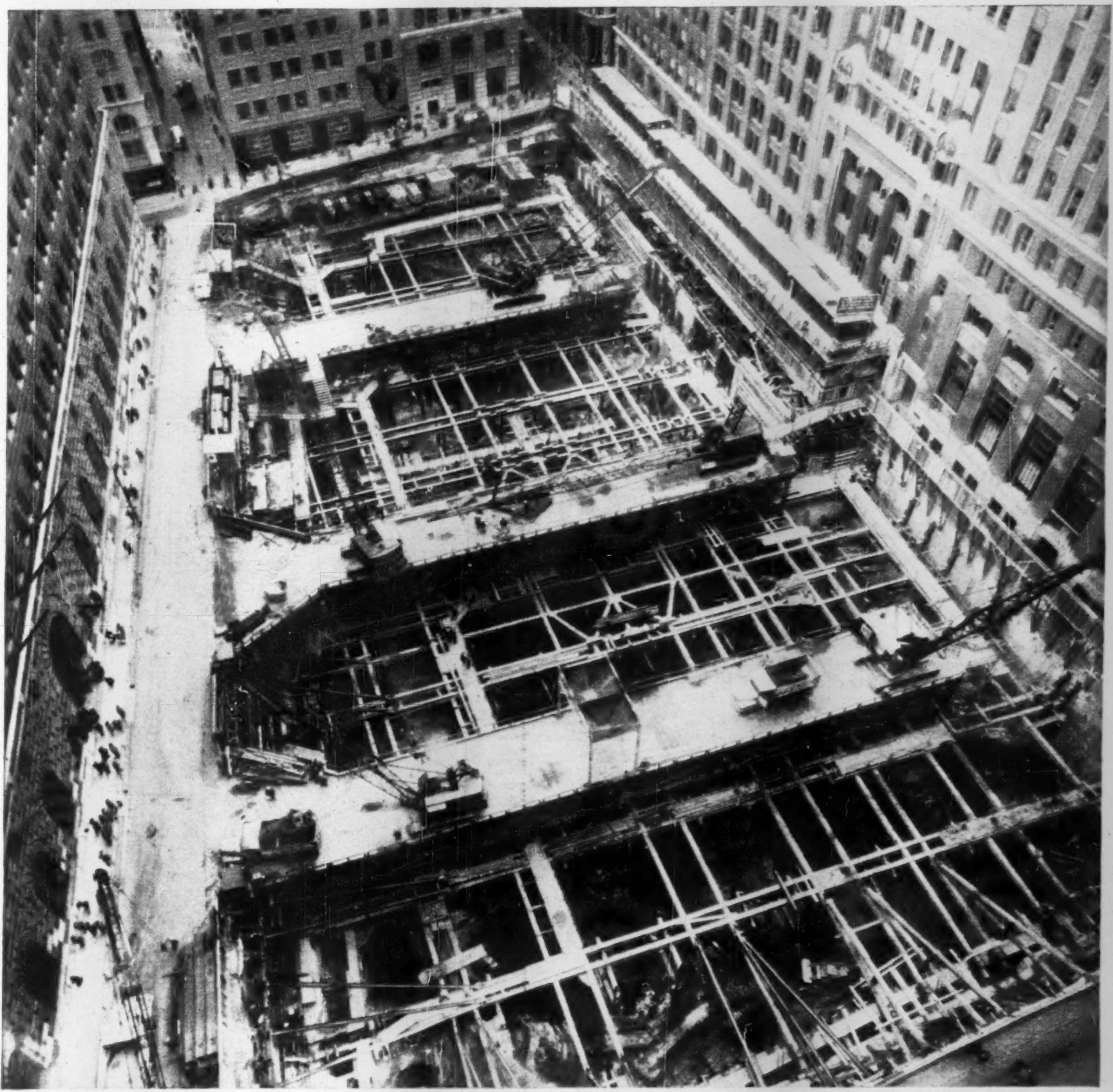
1. 5-in. thick plate for reactor is fabricated at CB&I's Birmingham, Alabama plant.

2. Workman smooths seams on an assembled section.

3. X-ray machine for checking seam welds. Machines operating at 1,000,000 and 2,000,000 volts are used to completely inspect steel vessels as much as 10 inches thick.

4. 72-ton top section for reactor-regenerator is lowered into position under supervision of CB&I erection specialist.



General view of Chase Manhattan bank site during early construction stages. The foundation contractors for this work are the Foundation Co., George M. Brewster & Son, Inc.; and Joseph Miele Construction Co. The foundation engineers are Moran, Proctor, Mueser and Rutledge.

Steel Piling Cofferdams for Chase Manhattan Bank

To make space for six full stories below street level for the new Chase Manhattan bank building, contractors are excavating a huge pit 90 ft down into Lower Manhattan.

To reach bedrock, the foundation excavation had to go through old building foundations, which were underlain by varved red silt (locally called "bull's liver"), hardpan and boulders. The outer walls on the perimeter of the lot were constructed in deep box cofferdams. The upper portions of the boxes were sheet-piling, driven through the unstable varved silt. The lower portions were soldier beams and breast boards. Part of the solution of a very difficult problem was the chemical grouting of a sand and gravel stratum carrying full hydrostatic head which underlies the hardpan at the easterly end of the site. Excavated material was removed on three ramps.

Bethlehem supplied the steel sheet piling for the cofferdams, the H-pile soldier beams, and the structural steel bracing for the cofferdams.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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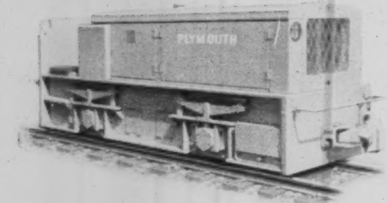
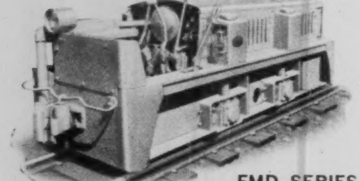


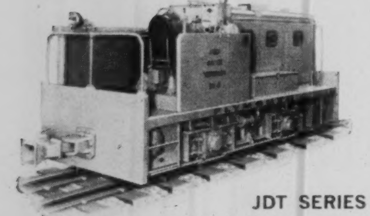
Model DMS 8 to 12 tons

...other compact, powerful models 3 to 10 tons

Do you have a tough construction, tunneling, or mining job? Plymouth Mine-O-Motives with Diesel-hydraulic power and exhaust conditioners take them all in stride, are presently working on some of the toughest jobs in the U.S.A. Available with chain or shaft drive, the extra-rugged construction of Plymouth Mine-O-Motives will save you money and help you beat deadlines. Send a brief outline of *your* hauling problem to Dept. A-4 today!



FMD SERIES
5 or 6 tons, extra low, short wheelbase models.



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REDUCES PIPE-LAYING COSTS . . . Universal Pipe and TYLOX Gaskets are pre-assembled at the factory and delivered direct to the job site. Merely shoving pipe home into the line (as shown in the photo) completes the joint. Mud and water don't slow up the work. Laid line can be backfilled at once.

NEVER DETERIORATES . . . Sewerage and industrial waste acids and alkalies can't harm Universal Vitrified Clay Pipe. When coupled with equally acid-resistant TYLOX Flexible Couplings, the resulting line is proof against deterioration throughout!

PROJECT: Sanitary sewer for City of Wooster, Ohio
ENGINEERS: Harold Slater, City Engineer, and Jones, Henry & Williams, Consulting Engineers, Toledo, Ohio
CONTRACTOR: Walter Jones Construction Company, Wooster, Ohio
PIPE: 8" to 21" Vitrified Clay Tylox-Coupled Pipe, manufactured by Universal Sewer Pipe Corporation, Cleveland, Ohio

FOR QUICKLY BUILT, PERMANENTLY WATERTIGHT SEWER LINES,
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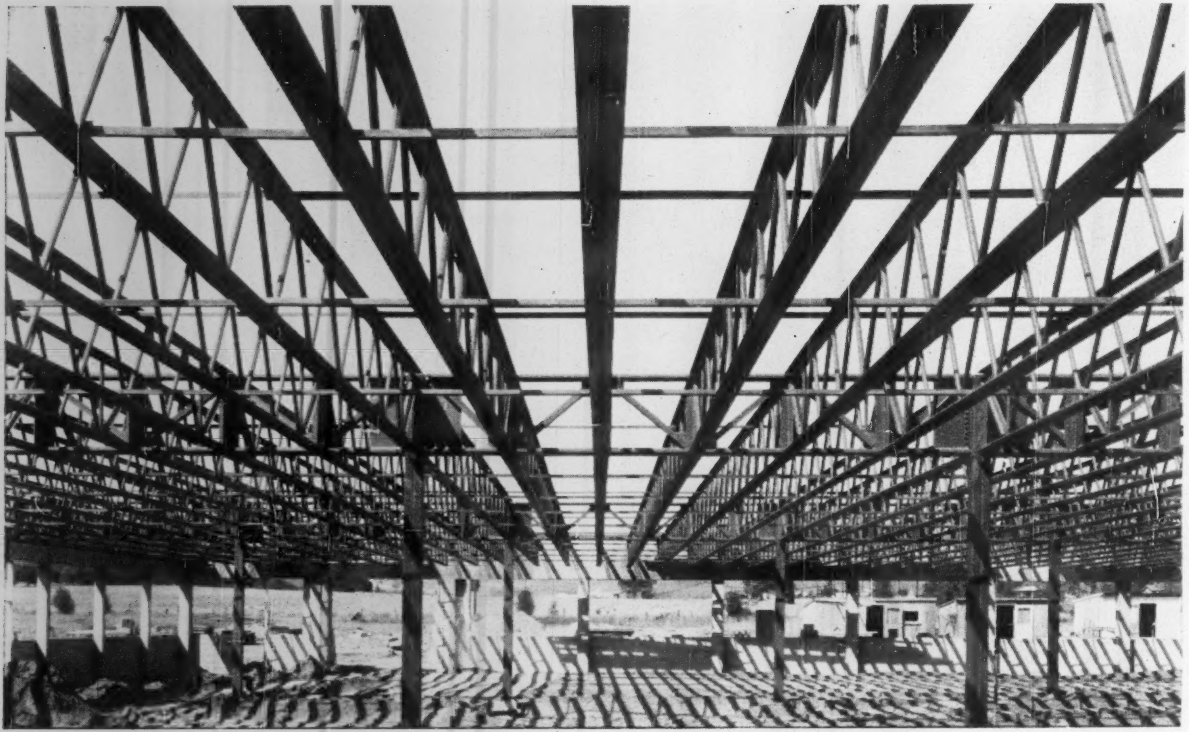
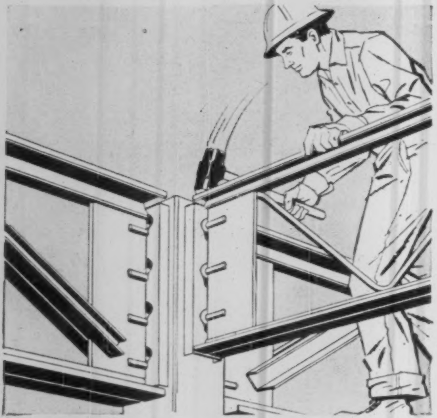


In Beaverton, Oregon, 108,000 square feet of steel framing was erected in 19 days...



V-LOK framing is hoisted into place, interlocked and hammered down for permanent placement. No bolting, on-the-job welding or riveting.

V-LOK

TRADE MARK REGISTERED

made the BIG difference!

Tektronix, Inc., Beaverton, Oregon, profited by using speedy, structurally sound, Macomber V-LOK construction for the framing of their new production building.

Five 21,600 square foot units were constructed. Steel framing with the Macomber V-LOK interlocking system meant no on-the-job bolting, riveting or welding. Each unit was erected in three to four working days . . . at substantial savings.

Recently, the company reordered steel twice for additions totaling 28,800 square feet. By duplicating plans, steel could be delivered more promptly, and completion time reduced.

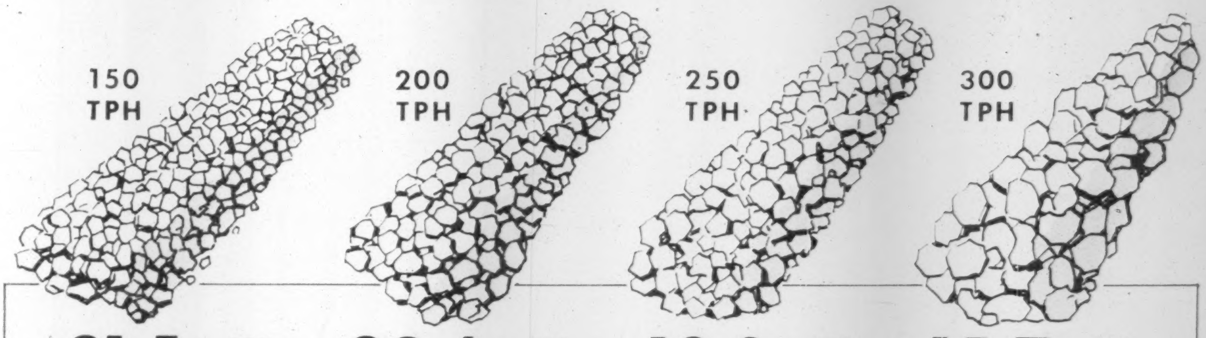
Building Design—Tektronix, Inc., Mel Lofton, designer
Structural Engineer—I. A. Cooper
Contractor—W. E. McChord

V-LOK design manual available

MACOMBER

CANTON 1, OHIO

How do the prices you pay for subbase materials compare with these?



150 TPH	200 TPH	250 TPH	300 TPH
31.5¢ PER TON	23.6¢ PER TON	18.8¢ PER TON	15.7¢ PER TON

THESE ARE COSTS BASED ON PREPARATOR IN-PLACE PRODUCTION

In-place production of subbase materials from windrowed bank-run or native over-size materials by the BROS Preparator is producing outstanding cost savings in many parts of the country and the world. The costs per ton shown here are based on conservative averages; compare your present material costs with them. The Preparator can make sizeable cost savings for you, too.

Cost of BROS Preparator, amortized over 3 year period, averaging 1,000 hours production per season, and including operator, fuel, changing hammers (but not hammer cost) and regular

maintenance	$11.81 per hour
Tow tractor or grader operating cost	5.75 per hour
Set of BROS ALLOY hammers (22), av. production per set, 16 hours	29.70 per hour
Total hourly operating costs	$47.26 per hour
Cost at 150 tph production rate	31.5 cents per ton
Cost at 200 tph production rate	23.6 cents per ton
Cost at 250 tph production rate	18.8 cents per ton
Cost at 300 tph production rate	15.7 cents per ton

Production rates will vary with the type of materials and the sizes required. Production exceeding 300 tph has been very frequent. Hammer wear also varies with type of material; with but several exceptions, wear has averaged 16 or more hours production on every job. Material reduced from native over-size has sharp friction angles which contribute to resistance to displacement under traffic loads.

The Preparator is a tough, rugged machine, reducing all types of materials from limestone to blasted lava rock to acceptable subbase gradations. Your nearest BROS Dealer has the latest information on the Preparator; see him this week.

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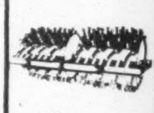

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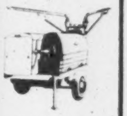
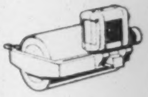
ROLL-O-PACTOR



BITUMINOUS CIRCULATOR



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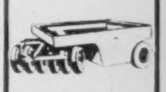

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No wonder SPANALL is so popular for beam, slab and suspended formwork! It's so easily installed . . . with built-in camber . . . with ample load-bearing safety factor . . . with clear, open work spaces in areas below the formwork—eliminating forever the forests of cumbersome, costly vertical shoring.

Stripping, too, is fast and easy; SPANALL sections are quickly moved and positioned for successive formwork . . . or telescoped and stored with space-saving economy.

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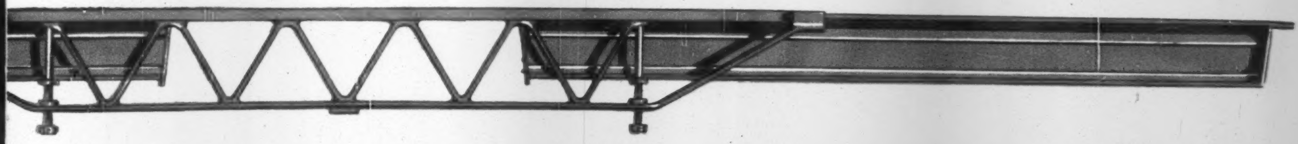

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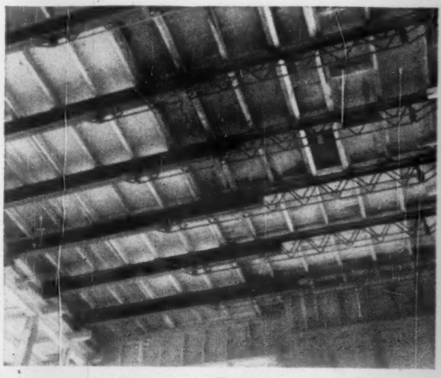
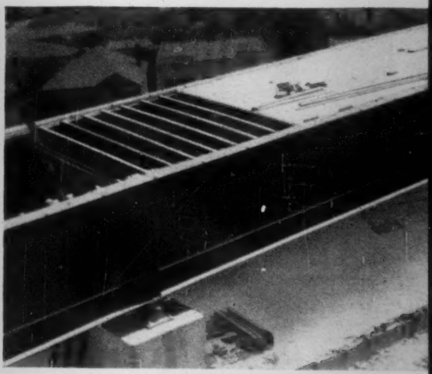


SPANALL HORIZONTAL SHORING efficient time-saver on floor and deck concrete formwork: flat slab . . beam and slab . . structural steel . . metal pan . . drop head . . filler block.



Repeated use of SPANALL HORIZONTAL SHORING, assembled to desired span lengths, speeds formwork construction on Carquinez Bridge along new California State H'way system.

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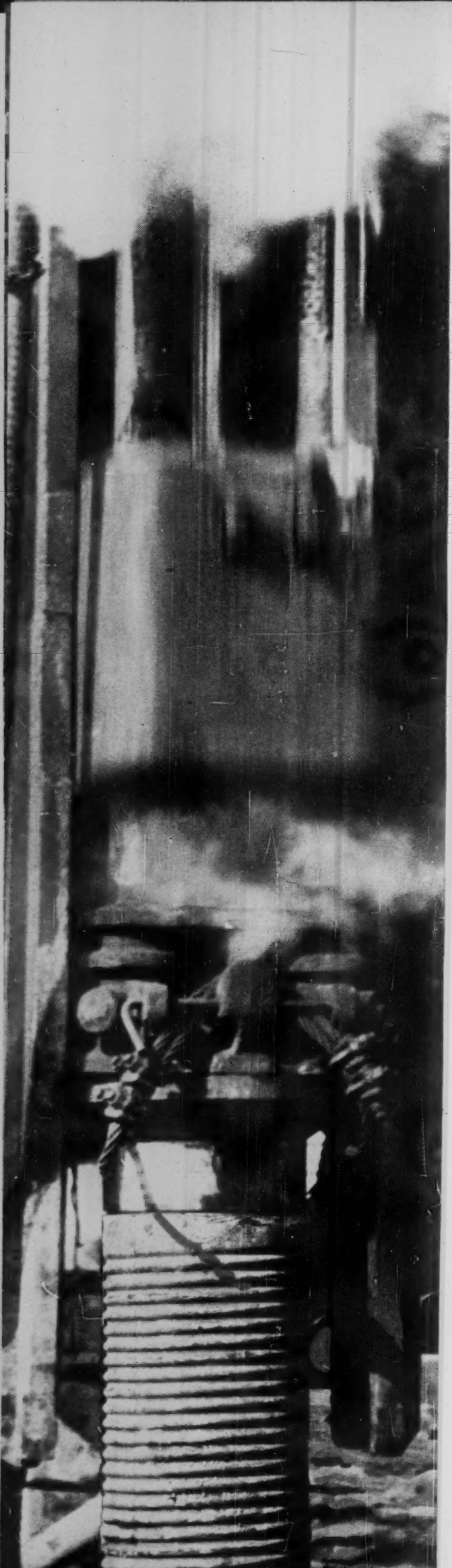

PICTURE OF A BARGAIN BEING DRIVEN

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Reader Comment

Claims Low Bids Got Jobs

SIR—In reporting on the recent awards of large civil engineering contracts by the Snowy Mountains Hydro-Electric Authority in Australia (ENR May 8, p. 17), you stated: "Details of each award were not disclosed, reportedly because lower Japanese bids were rejected on political grounds."

This statement is completely erroneous. The Japanese bids were in fact considerably higher than the successful tenders and the individual awards were published on May 7. They are:

- The Tooma-Tumut Diversion comprising an earth and rockfill dam, 9 miles of diversion tunnel, and appurtenant works, awarded to Theiss Brothers, Queensland, Australia, $20.5 million.
- The Murrumbidgee-Eucumbene Diversion comprising a concrete gravity dam, 10 miles of diversion tunnel, and appurtenant works, awarded to the American joint venture of Utah Australia, Ltd. and Brown & Root Sudamericana, Ltd., $14.4 million.
- The T.2 Project comprising a concrete gravity dam, 7 miles of tunnel, and an underground power station 800 ft below ground level, awarded to the American joint venture of Kaiser-Perini-Morrison-Raymond, $40 million.

A. HUMPHERY
Liaison Officer
Snowy Mountains Hydro Electric Authority
Denver Federal Center
Denver, Colo.

EDITOR'S NOTE: Practically the entire Australian press carried the interpretation regarding the rejection of Japanese bids that ENR's Melbourne correspondent reported. Much of that country's press still believes this interpretation is correct, especially since the Snowy Mountains Authority as yet has not released the Japanese bid figures.

Pitfalls in Cost Studies

SIR—Referring to the article "Cost Study of Four Types of Hospital Floor Framing" (ENR, Jan. 23, p. 106) I was disappointed in your printing such detailed figures on such a controversial subject without more editorial comment. I fear these figures will lead to further over-simplified misconceptions as to the relative costs of concrete vs steel for multistory buildings.

Many important points in total cost and relative value have been omitted. I would like to list only a few:

1. Cost of footings and foundations were considered constant. Total loads on interior footings will vary a bit over 50% from Type 4 without ceiling treatment and Type 1 without ceiling.
2. The remarks about fireproofing steel and price including fireproofing imply that the concrete systems do not require ceilings. Very few hospitals and no offices I know of are left exposed. If left exposed, expensive rubbing or texturizing treatments or very expensive formwork is necessary.
3. Only one system of steel framing was used. Experience in the investigation of specific problems shows that the most economical system is not apparent at first glance. Further investigation often indicates some other framing method rather than the "obvious" may be 10% or 15% less. Economies of composite floors or continuous welding should be checked.
4. This case gave no credit for saving in floor-to-floor height, since it was an addition to an existing building framed with pain joists and 18 in. deep beams.
5. No mention was made of pipes, wiring, or air conditioning, which often require suspended ceilings in all or most modern buildings.
6. Costs are based on 1957 prices for steel, which your magazine quotes as 10% to 20% higher in some cases than current ones.
7. Spans and column arrangements may be typical for some hospitals and apartments, but most office buildings are considerably wider than 17 ft, where steel has the advantage.
8. The adaptability and salvage value during the long life of a permanent building are often very important. Very few structures go through their life span without major alterations or adaptations to changes in operation or addition of equipment affecting the frame.

There is no intention here to criticize the author or his decision to construct this particular addition by the same method used in the original structure. My complaint is that many readers, in their effort to find a simple

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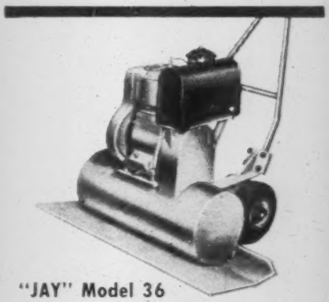

"JAY" Model 36

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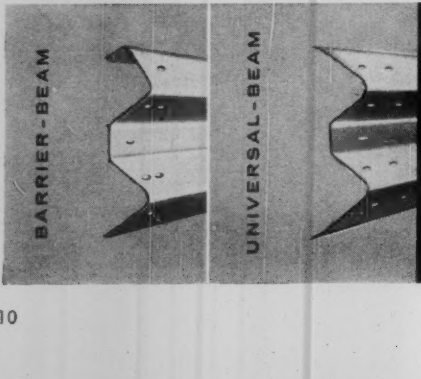

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solution to the very complex problem of choosing an economical framing system, will apply the figures in this article where they are not applicable.

Always lost in such detailed comparisons is the most obvious conclusion, to which you did refer in your editorial comment. In the overall cost of the building the total estimated difference between one framing system and another is often less than the difference between one contractor's bid and another.

HAROLD ENGSTROM
*Chief Engineer
Arkansas Foundry Co.
Little Rock, Ark.*

Useful

SIR—I congratulate you and the authors on two very useful recent articles. These are "Docking Fenders: Key to Pier Protection" by Louis A. Volse (ENR May 8, p. 40) and "How Good Are the Diesel-Powered Hammers?" by Edward M. Young, Jr., (ENR May 15, p. 54). They are very clear and concise, and should be of real assistance to engineers in two fields where authoritative, assembled information was lacking.

R. D. CHELLIS
*Structural Engineer
Stone & Webster Engineering Corp.
Boston, Mass*

More on Wave Equation

SIR—In your issue of Dec. 19, 1957 you published four letters regarding my article entitled "What Happens When Hammer Hits Pile" (ENR Sept. 5, 1957, p. 46) which discussed pile calculations made by means of a numerical solution of the wave equation. I would like to comment on these letters.

Mr. W. H. McTigue suggested the use of an analog instead of a digital computer. This is a possibility. Digital computers are usually considered to be more accurate than analog computers; but now that we have a digital method available it would be possible to compare analog and digital results as a check on accuracy.

Mr. Marvin Gates, who had proposed his own pile formula, wrote that I made the assumption that "ultimate driving resistance is equal to bearing capacity." What I actually wrote was: "some grounds 'set-up' and others 'relax' after driving, but the ability to compute driving resistance accurately would greatly improve the engineer's position in determining the safe bearing capacity of a pile."

Because, for purposes of calculation, I assumed that certain piles were point

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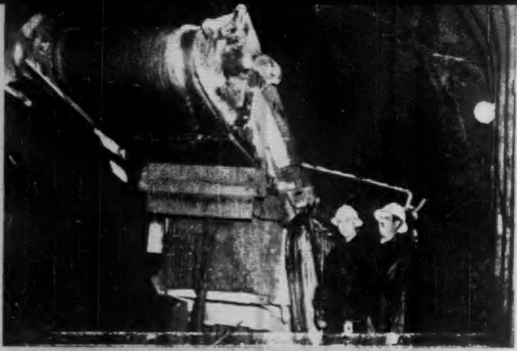

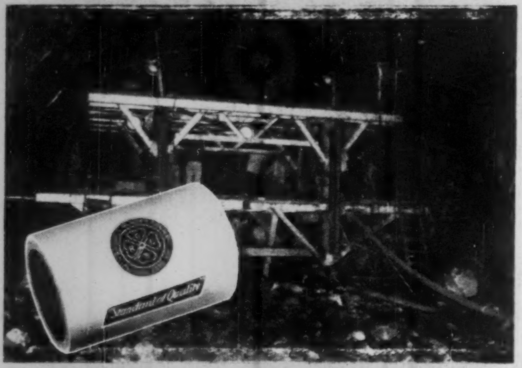

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bearing. Mr. Gates wrote that conventional column formulas should apply. When we assume that a pile is point bearing, we mean that the vertical frictional driving resistance of the soil is small enough to be neglected, or that we wish to neglect it for purposes of calculation. Seldom is a pile completely unsupported laterally at the instant of final point penetration. Of course, the part that is unsupported laterally must be later figured as a column forming part of the final structure.

Mr. Gates objected to the fact that, with an assumed factor of safety of 3, the wave equation gave less conservative results for certain cases than did the Hiley, Gates or Pacific Coast formulas. At present, I am not prepared to say that a factor of safety of 3 is always the desirable one. However, a method of computation that takes accurate account of the differences between various types of piles can operate with a lower factor of safety than a formula, such as the Gates, which assigns the same load to all piles driven to the same number of blows per inch, regardless of weight, length, or material composing them.

Since my article was published by ENR a small number of calculations have been made in which part of the ultimate driving resistance was distributed along the length of the pile, both uniformly and also with triangular distribution. These calculations have given more penetration per blow than obtained in comparable calculations in which all resistance was assumed to be at the point. We may therefore conclude, tentatively, that the assumption that all resistance is at the point is the conservative assumption when using the wave equation.

I might also add that what I am offering is a mathematical method of computation and not merely "another pile formula."

Mr. D. H. Lee wrote from England and suggested that credit should also be given to W. H. Glanville, G. Grime and W. W. Davis of England for applying the wave equation to pile driving in 1935. I concur fully. A classic paper prepared by them in 1938 in collaboration with E. N. Fox was published by the British Department of Scientific and Industrial Research as Building Research Paper No. 20 entitled "An Investigation of the Stresses in Reinforced Concrete Piles during Driving." This paper presented a strain gage experimental evidence to show that piles acted in general accord with the wave equation, and also offered a wave equation solution. However, these gentlemen were handicapped by the lack of modern electronic computers, and were therefore forced to include the simpli-

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✓ President
✓ Factory Superintendent
✓ Plant Engineer
✓ Maintenance Supervisor

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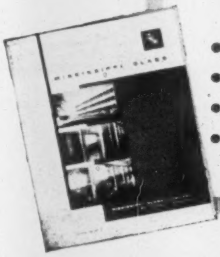

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fying assumption that the ground acted as a spring, whereas actually the ground has elastic-plastic characteristics.

Anyone who wishes to study the details of applying the wave equation and electronic digital computers to pile calculations, can obtain from me a reprint of a paper entitled "Impact and Longitudinal Wave Transmission" which I presented at a meeting of the American Society of Mechanical Engineers, and which was published in their Transactions of August 1955.

EDWARD A. SMITH
Chief Mechanical Engineer,
Raymond Concrete Pile Company
New York City

Diesel Pile Hammer

SIR—I was extremely interested in your analysis of the diesel pile hammer and particularly in the comments you have made regarding the three diesel pile hammers currently offered to the construction industry (ENR May 15, p. 54).

We were distressed to find that the illustrations used on page 54 are reversed. The photograph of the Link-Belt Speeder Diesel Hammer is shown over our name and the line drawing of our hammer. The photograph of the McKiernan-Terry DE-20 Diesel Pile Hammer is shown over the Link-Belt Speeder Hammer name and the line drawing of their hammer.

However, I would say, as member of a firm manufacturing one of these hammers, you have done a fine job in presenting an objective view of the diesel pile hammers. Although we might take issue with some of the points you make, we certainly could not but agree that such points are subject to argument and have been fairly presented in your article.

The kind of reporting done by you through your article we feel is a real credit to Engineering News-Record and a service to our segment of the construction industry.

G. ROBERT COMPTON, JR.
Vice President
McKiernan-Terry Corp.
Dover, N. J.

CALENDAR

American Society for Testing Materials, 61st annual meeting, Hotel Statler and Sheraton Plaza Hotel, Boston, Mass., June 22-27.

American Society of Heating and Air Conditioning Engineers, semi-annual meeting, Pick-Nicollet Hotel, Minneapolis, Minn., June 23-25.

American Society of Civil Engineers, Multonmah Hotel, Portland, Ore., June 23-27.

Association of Women in Architecture, national convention, Town House, Hotel, Los Angeles, Calif., June 30-July 2.

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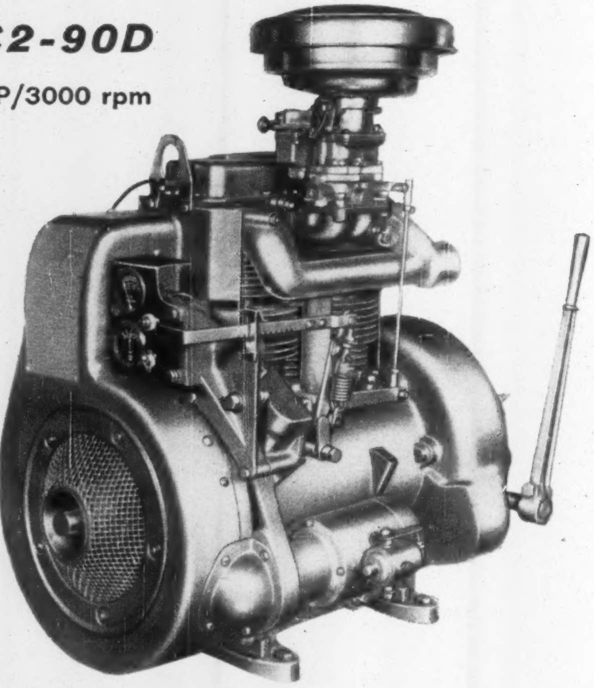
Two cylinders • 88 cu. in. displ. • 35 HP/3000 rpm



★ Highest HP/Pound: This rugged power plant packs more horsepower per pound dry weight than any other engine in its class: outperforms all other industrial air-cooled engines.

★ Lower Fuel Consumption: Higher volumetric efficiency means less fuel for the same power: up to 30% savings over competitive engines.

★ Excellent Response: Specially developed, two-barrel carburetor gives the C2-90D unequalled flexibility: keeps it "on top of the load" at all times.

★ Wide Octane Tolerance: The C2-90D can be run with gasolines from 75-100 octane rating: no need to "spoon-feed" this tough engine!

★ Close Speed Regulation: For constant speed applications, the Hercules C2-90D is unequalled: specially developed governor gives 2½% regulation from no-load to full-load, and regulation of 1% and better has been realized.

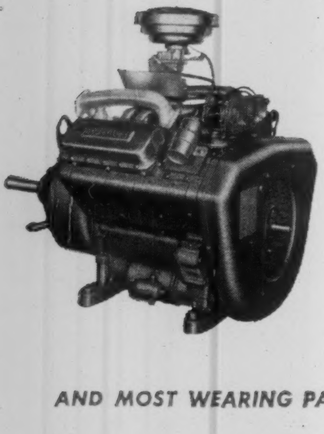
★ Fully Replaceable Bearings: This feature permits complete "top overhaul": engine need not be dismounted for repairs.

★ Full-Pressure Lubrication: Direct-drive, gear-type pump gives positive lubrication to wear points for longer life.

★ Rugged Construction: Extra-heavy crankshaft is fully balanced; stellite-faced valves and seats are available for longer wear; main bearings are oversize—no field failures over the past three years.

★ Easy Starting: Hot or cold, with manual or automatic starting, the Hercules C2-90D kicks over quickly—in all weather, indoors or out.

AND THE COMPANION CV4-180 . . . IN A CLASS BY ITSELF!



Four cylinders • 176 cu. in. displ. • 71 HP/3000 rpm

★ 71 Horsepower: No other industrial air-cooled engine comes close to the power range this V4 offers!

★ Responsive Power: Carburetion system, governor, and "oversquare" bore/stroke ratio combine to give the Hercules CV4-180 excellent response and close regulation, no-load to full-load.

★ and Economical, Too: The Hercules CV4-180 has excellent fuel economy; has all the maintenance-saving features of the C2-90D too, for long-term operating economy.

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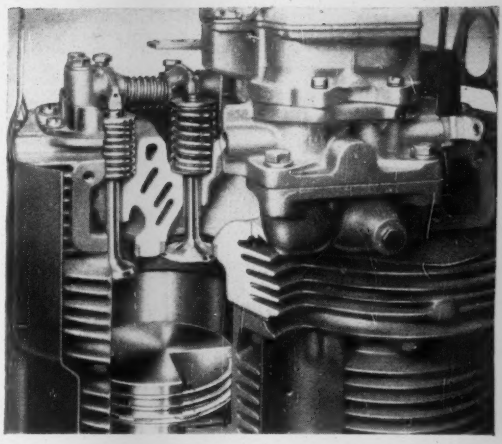
★ **EFFICIENT COMBUSTION CHAMBER DESIGN** evolved by Lycoming, designers of these air-cooled engines, is clue to their outstanding performance.

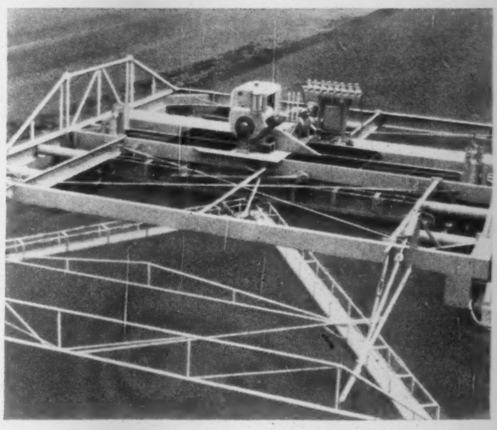


Sealed down-draft carburetor especially developed for these engines enables them to pick up load *fast* over entire speed range.

Overhead valves permit high compression at high efficiency. The exhaust valve runs cool too, without the need for an "over-rich" mixture. **Short intake manifold** delivers mixture at high turbulence, giving these engines wide octane tolerance and **LPG fuel** can be used without excessive loss of power rating. **Stellite-faced valves and seats** give long service and **double tapered piston rings,** with chrome-plated top ring, retain their seal at all speeds. **Honed cylinders** hold oil film even over long shutdown. **"Oversquare" design,** where bore dimension exceeds stroke, gives slower piston speeds and longer life—helps make engine responsive.

Exhaust manifold provides low back pressure, another factor in efficient operation.

★ **AND JOB-RATED TESTING means you get the power you specified!**



Every Hercules air-cooled engine is given a complete test run before it is shipped. This check of the actual horsepower delivered by your engine is your guarantee of proved performance and workmanship.

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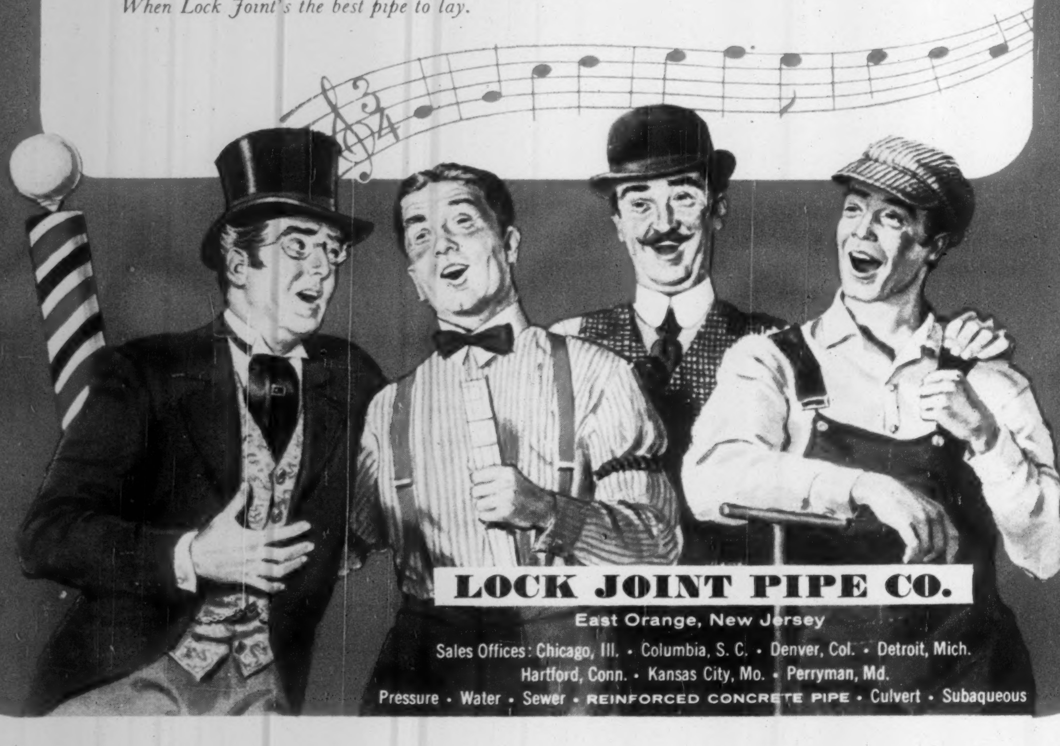

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ENGINEERING NEWS-RECORD

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CONTENTS

NATIONAL AFFAIRS

"Oscar" Can Cut Road Costs by Millions 23
One Cent Shift Nets $13 Million Jobs 25
Flaming Gorge Goes for $30 Million 26
Consultants Air Their Problems 27
Freeway Proposal Sparks Controversy 28
Clean Streams Group Gets Award 28
Engineering News-Pictures 29
Seabees: "Experts in Thievery" 32
Texas to Act on "Collusive" Bidding 32

RESEARCH

Better Lighting Needed, Study Shows 115
Truck's Outriggers Check Road 115
City Points to Aeration Answers 117
Heat Exchanger Eliminates Pier Ice Damage 118

FIELD AND OFFICE

High-Frequency Lighting Cuts Costs 120
Piles and Rods Hold Roadbed in Place 120
Added Pen Takes Guess Out of Flow Gage 125
Plastic Pipe Relieves Hydrostatic Uplift 125
Spreader Plus Screed Meet Specs 126

INTERNATIONAL

Tight Schedule for Largest British Road 133
Tower Straddles Exhibit Hall Site 136
AIDIS Congress Meets in Puerto Rico 138

NEW PRODUCTS

King-Size Rotary Compressor 145
Jet Conveyor Stockpiles at High Speed 146
Nylon Bristles Used in Rotary Sweepers 146
Finisher Built for Bridges or Roads 151
Base Paver Hooks to Crawler-Tractor 151
Manufacturers Publications 163

MEN AND JOBS

Engineers Give $20,000 to Scholarship Fund .. 177

BUSINESS AND FINANCE

Public Works: Congress Wants More 221
Hopes Rise as Home Starts Leap 222
April Machinery Orders Jump 4% 224
Cement Price Dips Temporarily at Dealer Level .. 224

LABOR

Labor Legislation Stirs Political Debate 227
Engineers: 10% Are in Unions 228
Jobless Pay: Now It's Up to the States 228
Union Bargaining Still Strong 230
No-Man's Land a Knotty Problem 231
Union Organizing Methods are Under Attack ... 231

Reader Comment .. 9
Calendar 14
Washington Observer 21
Unit Prices 75
Materials Prices ... 100
Legal 167
Obituaries 187
Books 188
Construction Reports 193
Scoreboard 219
Editorials 244

Back issues of ENGINEERING NEWS-RECORD *are generally available for the previous six months. Semi-annual indexes will be sent on request.* ENGINEERING NEWS-RECORD *is also indexed in Industrial Arts Index and Engineering Index.*

THE CONSTRUCTION WEEK

BIG CITY LIFT SLABS—New York City's first lift-slab job was bid this week. The structure will be a store with accessory parking at Avenue of the Americas and 39th St. in Manhattan. Seven contractors were invited to bid by the owner, Opera Holding Corp., after the Department of Housing and Buildings gave the project its tentative blessing. Gage & Martinson, consulting engineers, of New York City, designed it.

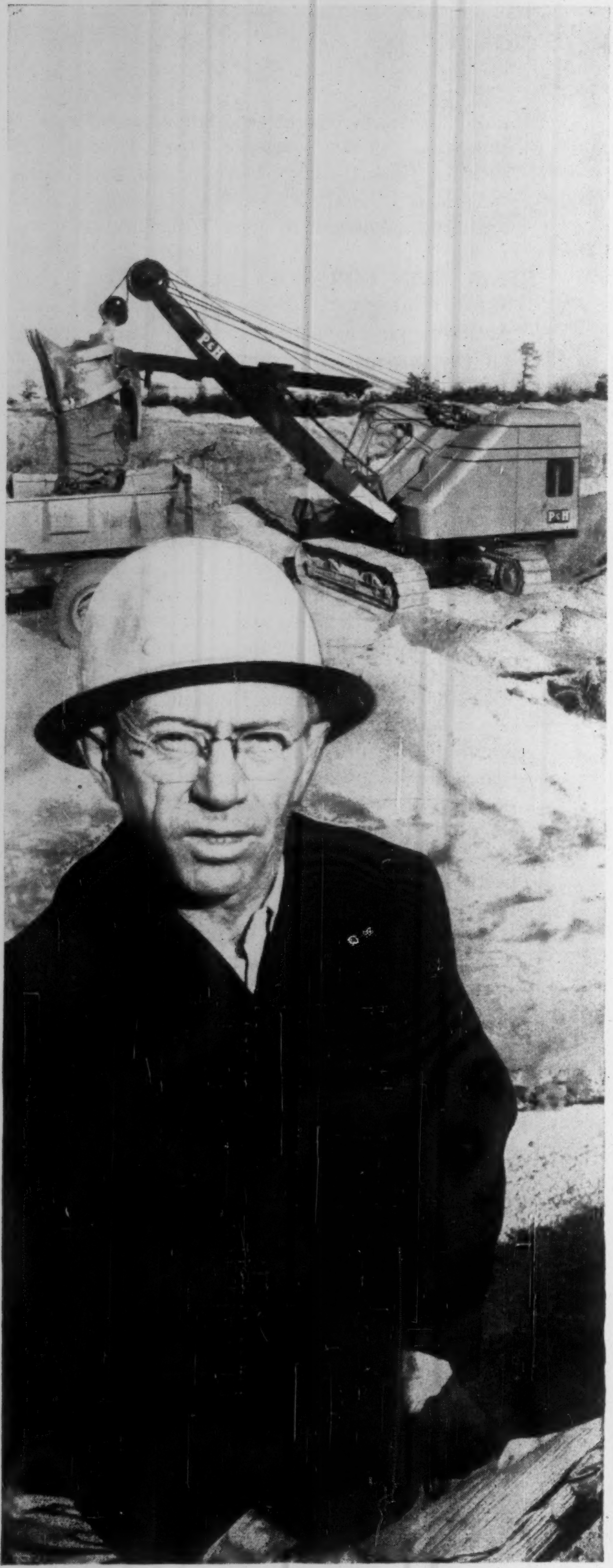
STEEL SKIN FOR ROLLING DOME—In a secret ballot, Pittsburgh's five-man Public Auditorium Authority picked stainless steel as covering material for the open-and-shut dome roof of the new city-county auditorium now being built (ENR Jan. 30, p. 30). The choice was unanimous despite the fact that stainless steel topped the alternates in price and added $242,000 to the base bid, which included a mill-aluminum roof. Alternates included colored aluminum.

GEORGIA ROADBLOCK—The Georgia Highway Department has called a halt to all condemnation proceedings involved in right-of-way acquisition for federal-aid roads. It may require an amendment to the state constitution to get the program moving again. A recent decision of the state Supreme Court denies the Highway Department the right to appeal appraisers' awards to property owners without first posting an amount of money equal to the disputed award. This would tie up millions of dollars, so the department has stopped its condemnations and is appealing to the legislature for a change in the law.

HARBORS BY ATOMIC EXCAVATION—The Atomic Energy Commission will send survey teams to Alaska this summer to see if a harbor can be excavated there with atomic explosives. This would be the first useful facility to be achieved using nuclear explosives under AEC's pioneer Project Plowshare to find peaceful uses for atomic energy (ENR Mar. 6, p. 31). The explosion could take place in 1960. Meanwhile, AEC is investigating other projects involving movement of earth and rock masses not practical or economical by other methods.

CONTRACTORS REBUFFED—Efforts of two contractor groups to upset a state prevailing wage determination are stymied by the Ohio Supreme Court. General Contractors Association of Akron and the Akron Chapter of Associated General Contractors were told they don't have a direct enough legal interest to support a challenge. Reason, says the court, is the absence of any evidence either association ever had or intends to enter into a public works contract.

GYMNASIUM FRAME COLLAPSES—The steel frame of a partly finished $1.1 million high-school gymnasium collapsed with an estimated $200,000 loss in Newcastle, Ind., last week.



"Power to really dig in and do a day's work"

Mr. Wulf, general manager of Monmouth Trucking Company Sand and Gravel Pit, is enthusiastic about his P&H Diesel powered ¾-yard P&H 255A shovel. You hear reports like his everywhere about the P&H Diesel. It consistently makes good equipment perform better and results in less downtime for maintenance.

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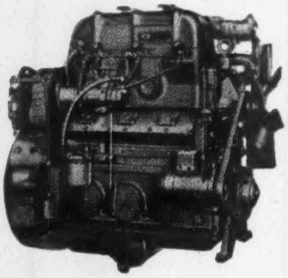
For all of your equipment—including crushers, front end loaders and other portable equipment—specify the one diesel with all the features that deliver top performance—P&H Diesel. P&H Diesel Engine Division, Crystal Lake, Illinois.



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WASHINGTON OBSERVER

- **Rivers and harbors approval assured**
- **Seaton favors Pleasant Valley high dam**
- **Air Safety may help airport construction**
- **Public Roads to rule on "Buy American"**

● **Congress is working out with the Burget Bureau a $1.6 billion rivers and harbors authorization bill that President Eisenhower will approve.** It will contain some of the projects the President objected to when he vetoed the measure this year for the second time. But it also will omit a number of those he found unacceptable.

Sen. Robert Kerr (D., Okla.) says that all projects in the bill unanimously approved by the Public Works Committee have been okayed by the White House. Passage by the Senate is assured. The House version will be somewhat different, but the final bill will be close enough to get a Presidential signature.

—

● **Best plan for development of the Middle Snake River in the Pacific Northwest requires a high dam at the Pleasant Valley site,** according to the latest stand taken by Interior Secretary Fred Seaton.

Secretary Seaton says the Nez Perce proposal—a high dam below the junction of the Salmon and Snake Rivers—won't be feasible. He believes there's little chance of finding a satisfactory way of getting the Salmon around a Nez Perce high dam, contrary to the opinions of the backers of the Nez Perce site.

Federal Power Commission last year rejected an application for low dams at Pleasant Valley and Mountain Sheep from a private utility group. Reason: The project would conflict with a Nez Perce dam which FPC believes would better serve comprehensive development of the Columbia Basin, of which the Snake is a part.

The private group is now awaiting an FPC decision on a new plan that calls for a high dam at Mountain Sheep, just above the confluence of the Snake and Salmon, which floods out the Pleasant Valley site.

—

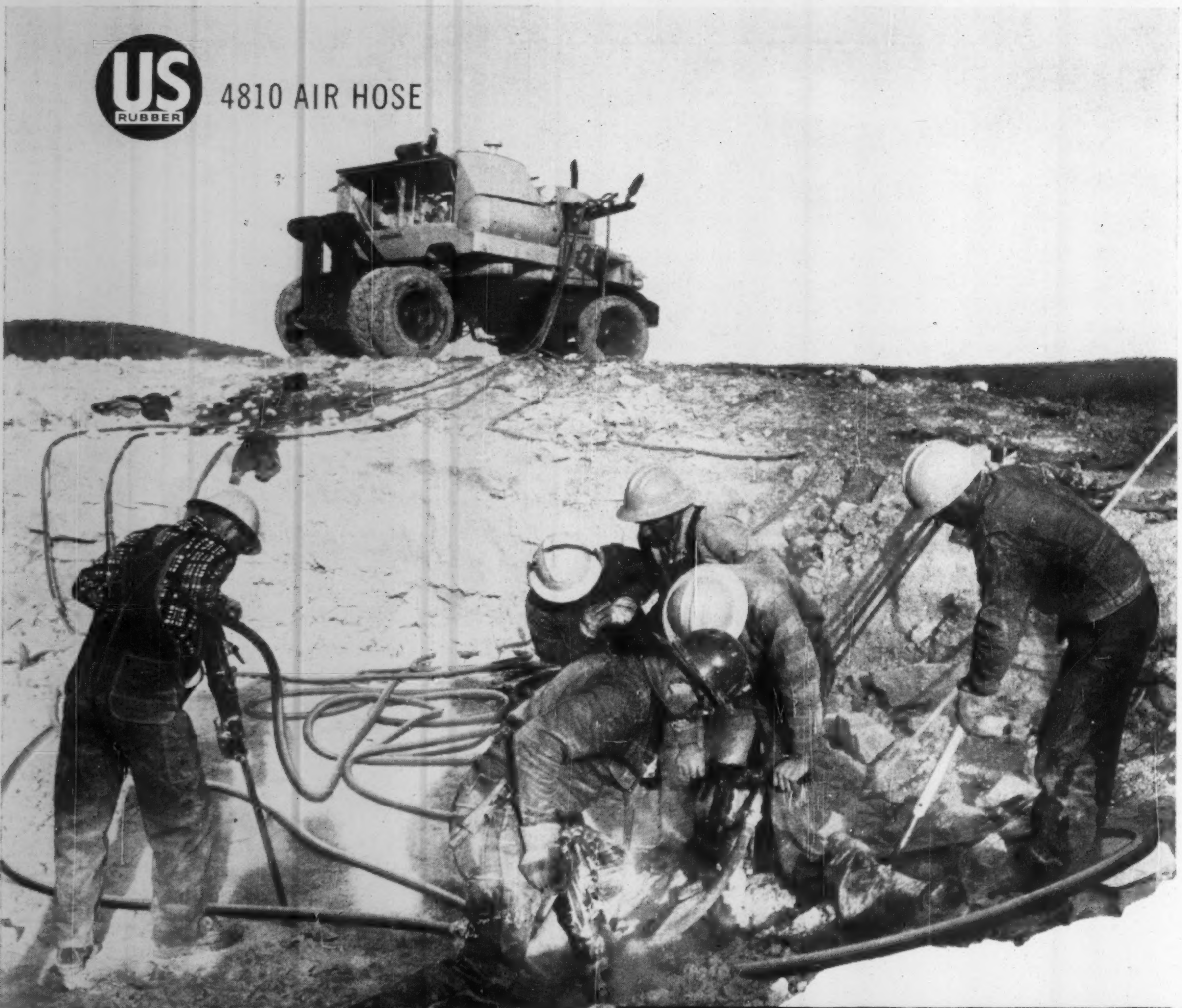
● **The pressure to create a new agency with power over civilian and military air traffic may wind up helping airport construction programs.** President Eisenhower has gotten behind Democratic moves to create the federal aviation agency. It now looks as though the plan will be approved before Congress goes home.

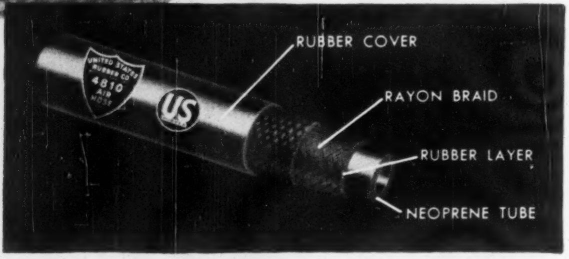
Air crashes have spotlighted the need for facilities to handle the jet traffic coming up—and this means longer runways. There's been publicity about technical ways of shortening take-off distances, but none of them so far can be counted on. As of now, 11,000-ft runways are needed for a fully-loaded jet transport. Only a handful of airports can handle them today.

—

● **Public Roads officials are going to take a hard look at state highway regulations that exclude foreign materials in federal-aid highways.** Texas has proposed to make such a regulation effective in August. But Bureau of Public Roads may yet object (ENR June 12, p. 136).

Highway Administrator Bertram Tallamy and Secretary of Commerce Sinclair Weeks will both have a hand in the study, the first one ever to be made on the issue of "Buy American" on federal-aid highways. Primarily affected: steel and cement from such countries as Japan, Germany, Belgium.


US RUBBER
4810 AIR HOSE


UNITED STATES RUBBER CO 4810 AIR HOSE
US
RUBBER COVER
RAYON BRAID
RUBBER LAYER
NEOPRENE TUBE

Where men and hose flex their muscles

Here's the hose that's as rugged as the men who use it. On the really tough construction jobs—where tight quarters, abrasive terrain and high working pressures take their toll of ordinary air hose—mandrel-made, wrapped-finish, U.S. 4810 Air Hose stands up to use *and abuse.*

Yet, despite its great strength, 4810 is no muscle-bound hose. "U.S." engineering has made it easier to handle, readily flexible, able to take higher working pressures—*and less expensive*—than the conventional air hose you might be using. It's one of a complete line of U.S. Rubber construction hose.

• • •

When you think of rubber, think of your "U.S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.

Mechanical Goods Division

United States Rubber

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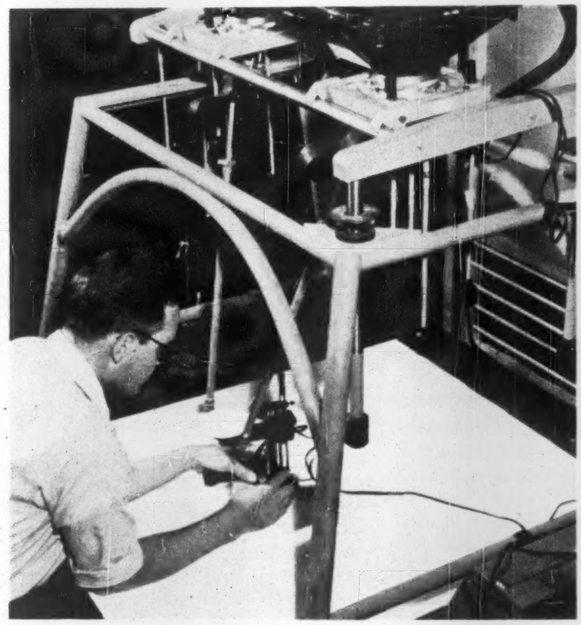
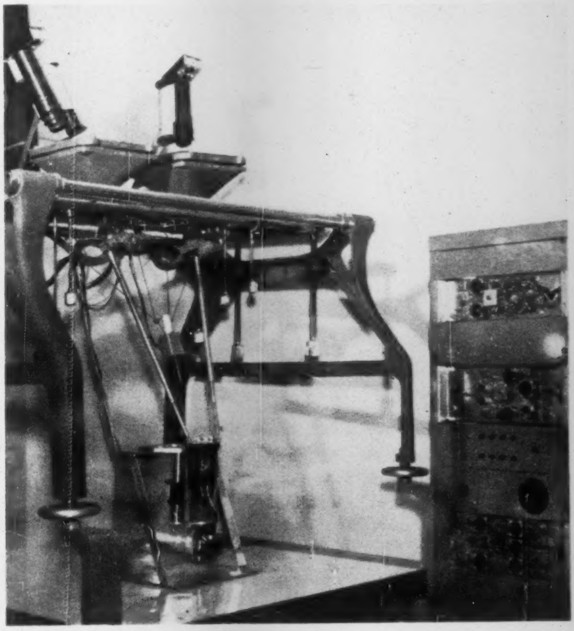


Man Needed

Now it takes operator to find ground elevations on aerial photos.



Man Eliminated

New device, "Oscar," does a better, faster job automatically

"Oscar" Can Cut Road Costs by Millions

The missing link in complete mechanization of highway design is no longer missing. A device that could save millions of dollars in highway construction has been developed.

It's called "Oscar." Actually, it's AUSCOR (for Automatic Scanning Correlator), but don't let the name bother you.

It's simply a device that can do electronically what operators of stereoscopic plotting machines now do: Find ground elevations from overlapping aerial photos. But it can do this 40 to 100 times faster, claims the inventor.

Its speed (plus accuracy) will permit an unlimited number of highway alignments and profiles to be checked out to attain the route location with minimum earth moving involved. A 1% or 2% saving in earthwork costs is foreseen, over and above the 5% to 10% now being saved with photogrammetry-electronic computer operations.

"Oscar" is hailed by highway engineers and photogrammetrists as a real break-through—a completion of the mechanized highway engineering process. At private previews of the device in Toronto, Ontario (ENR May 15, p. 19) there were enthusiastic statements from highway and photogrammetric experts, including the Bureau of Public Roads, H. A. Radzikowski and S. E. Ridge, Charles Spooner of the Army Map Service and Russell Bean of the U. S. Geodetic Survey.

An aerial surveying firm developed "Oscar." The inventor is G. L. Hobrough of Photographic Survey Corp., (a division of Hunting Assoc.), Toronto. Other companies have spent many years and dollars in the effort to develop such a device.

The new instrument is actually an attachment to a standard plotter. It's speed makes feasible the use of the so-called "digital terrain model," which is simply a broad strip map expressed in digital form (spot elevations in a pattern). Terrain information so expressed can be fed to a computer to come out as profile and cross-section pictures.

Right now, the combination of photogrammetry and digital computers in route location and final road design is saving 5% to 10% on earth-moving quantities in rural areas, by enabling trial of a number of alignments and grades. (Earthwork in rural areas can make up 40% or more of highway costs). Substituting "Oscar" for the man at the stereoplotter will enable speedy, electronic trial of an unlimited number of alignments and grades. Thus, the digital terrain model can possibly squeeze out another 1% or 2% saving on earthwork.

Apply this rate of saving to earthmoving to be done only in rough, rural areas on the multi-billion dollar highway program, and you come up with hundreds of millions of dollars saved.

In its present state of development, "Oscar" does two things:

1. It automatically adjusts two overlapping aerial photographs in the plotter in minutes, compared to an hour or more required by a plotter operator.
2. It takes spot elevations almost instantaneously or can take a continuous profile in a very rapid fashion.

As yet, "Oscar" cannot trace contours. However, Inventor Hobrough and staff are working on the electronics that will seek out preset ground elevations. The feeling is that this will be easy enough, since this was achieved earlier in an automatic device by Hycin Aerial Surveys, Inc., Los Angeles. (Although this device failed to achieve the required accuracy.)

(*Continued on page 24*)

. . . What two potential users say about "Oscar"

"We look for the device to speed up our operations from the present 20 to 40 hrs required to analyze . . . to about 2 hrs."
Charles Spooner, Army Map Service

"Oscar is considered a major breakthrough. The machine removes the tedious and routine repetitious work . . ."
H. A. Radzikowski, Bureau of Public Roads

"Oscar" finds ground elevations in the same way a plotter operator does. It views overlapping aerial photographs stereoscopically, "keeping the dot on the ground." In manual operations, the stereoscopic viewer, or platen, is moved up and down. The final position represents the vertical height—which is converted to actual dimensions by knowing the photographic scale. With "Oscar," the platen is replaced with a cathode ray tube that moves as the platen does.

• **Is it that good?** Here's what a few photogrammetric experts have to say:

Charles Spooner, chief of technical development of Army Map Service (at present operating 173 stereoscopic plotters) says:

"AUSCOR represents a major and fundamental breakthrough in the technique of photogrammetric engineering. While it is doubtful that the device will ever do away completely with the need for an operator, particularly when information on public works engineering and military mapping is being considered, it should permit this data to be processed much faster.

"We look for the device to speed up our operations from the present 20 to 40 hours required to analyze a pair of aerial photographs to about two hours time. With development of associated automatic equipment we look for ultimate speeds of one hour or less to do the job."

Highway engineers, Radzikowski and Ridge, respectively chief and assistant chief of development of the Bureau of Public Roads, say:

"AUSCOR is considered a major breakthrough. The machine . . . removes the tedious and routine, repetitious work of the photogrammetrist through equally reliable automatic control and read-out of vertical heights, especially toward the end of a busy day when a human operator may tire.

"It is estimated that AUSCOR will, even in its present state of development, increase the speed of obtaining terrain information by photogrammetry for highway engineering use by a factor of four. Additional developments now contemplated should substantially increase this estimate."

The Corps of Engineers' Engineering Research and Development Laboratory at Fort Belvoir, Va., at the request of Army Map Service, has asked the manufacturer to supply them with two of the devices.

• **How applied in highways**—While much of "Oscar's" utility to map-makers will be in its projected contouring ability, some highway authorities believe it is capable of securing spot elevations and profiles as a transcendent feature.

In its existing form, "Oscar" includes a Kelsh plotter. The cathode ray tube, an equivalent of the stereoscopic viewer, has to be moved horizontally by hand. The device has produced profiles at the rate of 4 in. per second. This is a decided improvement over manual platen operations. However, this arrangement doesn't come close to maximum utilization of the device because so much time is still taken up with horizontal measurements to identify points for which elevations are being secured.

The obvious answer is mechanical control for horizontal movement with automatic read-out devices for all three dimensions, the x, y and z coordinates. Devices for doing this are available and already operating on a number of plotters in this country and abroad. Using them as a part of "Oscar" is not considered to be a difficult problem. The profiling speed of 20 in. of stereo model per second—100 times faster than a human operator—is foreseen by Inventor Holbrough.

Development of associated read-out devices for use in highway engineering will be undertaken by Photronix, Inc., of Columbus, Ohio (also affiliated with Hunting Assoc.) Photronix is one of the country's most advanced practitioners of mechanical highway design. It will obtain another prototype of "Oscar" and attempt to integrate it with various automatic linkages on hand between platen, electronic computer and automatic line plotter.

One of the first stages of this development will be to program "Oscar" and its horizontal movements so that spot elevations can be taken on any type of pattern, such as per unit change in elevation. Another early prospect is use of magnetic tape to receive the increased volume of information "Oscar" can produce.

• **How it works**—The electronics involved in making "Oscar" work is quite complex. It's also the crux of a pending patent situation for Photographic Survey Corp.

Basically, a cathode ray tube emits electron beams that are picked up by light-sensitive tubes mounted above the two aerial photographs being studied in the platen. When the cathode ray tube is "off the ground," each receiving tube senses a different light value. That's because the electron beam is passing through a different point in each diapositive. Correcting signals are sent through a host of electronic components to the motor driving the cathode ray tube platen.

When the platen is at the correct height, the base of the cathode tube shows a tiny spot, much like the dot in a normal platen. When the platen is off the ground, it shows a relatively large pattern of spots.

"Oscar" can be viewed stereoscopically, as a check.

Two U. S. geological survey experts brought their own stereophoto pairs to Toronto to check the accuracy of "Oscar's" performance. Their conclusion: "Every bit as accurate as the best of plotter operators and much more reliable since it doesn't get tired."

PSC's chief executive, Douglas Kendall, anticipates the device will be commercially available within a year and a half.

Small change makes a difference . . .

1¢ Shift Nets $13 Million Job

A penny a yard in excavation price determined the award last week of more than $13 million worth of construction work at Richard I. Bong Air Force Base in Wisconsin. What's more, the relative position of the two lowest bidders was reversed after the bid opening by discovery of a mistake in arithmetic.

Result of this photo-finish comedy of errors showed S. J. Groves & Sons Co., Minneapolis, had a price that was $27,000 under that submitted by Western Contracting Corp. Groves was formally awarded the contract at its corrected price of $13,606,998.

Groves and Western were two of nine contractors who submitted close bids for runway and taxiway work on the airbase, which is near Kansasville, Wis., 60 miles northwest of Chicago. Western's price for the work was $13,633,867. The other seven bids ranged from $14.3 million to $18.8 million. The government estimate was $17,366,281.

When the bids for this work were opened, Western was the apparent low bidder, while Groves was second. But, when government engineers checked the multiplications and extensions of all the bids they discovered that although Groves' unit bid price for the 13 million cu yd of excavation was 44 cents, the extended total figure for that item was based on a price of 45 cents per cu yd.

After correcting this error of one cent per cu yd, Groves' total bid was reduced by $137,000, bringing it below Western's total bid.

The multimillion dollar base is being built under supervision of the Chicago District, Corps of Engineers, for flight operations by the Strategic Air Command. Target date for beneficial occupancy is September 1960. Major features include an 11,500 x 200 ft runway designed for 265,000 lb wheel loads, taxiways, a 2,350 x 775 ft operational apron, service buildings and complete community facilities for the personnel who will operate the base.

The first major contract, on which the close bids were received June 5, includes construction of the 11,500 x 200 ft runway with 75-ft-wide matching taxiways, drainage and over-lot grading.

Although the estimated contract quantities give some indication of the scope of the contract, runway and taxiway design together with construction requirements pose a number of challenges to the contractor.

• Subgrade problems—One big problem is the variable nature of the supporting subgrade for the runway and taxiways. It includes considerable peat and other unsuitable material that must be replaced. Due to the unstable nature of some of the soil sections, a maximum of 90% density at optimum moisture is specified instead of the usual 95% or better.

In addition, the compacted subgrade will be required to undergo a seven-month standing period before pavement construction can be started. This means that although some concrete paving will be done next year, the bulk of it will be placed in 1960.

• Pavement design—Runway and taxiway pavements are designed for a constant thickness of 56 in. from top of subgrade to top of pavement. There are four basic pavement designs comprising an unreinforced concrete pavement on a stabilized aggregate base course and a course of filter material.

Type A pavement calls for 20 in. of concrete on 32 in. of stabilized aggregate; Type B, 19 in. of concrete on 33 in. of stabilized aggregate; Type C, 16 in. of concrete on 36 in. of stabilized aggregate; and Type D, 14 in. of concrete on 38 in. of stabilized aggregate. In all cases a 4 in. layer of filler material is placed between the stabilized aggregate and the subgrade.

Pavement designs for the runway, primary and connecting taxiways, touchdown and turning areas vary with their location and usage.

In general, the central 100 ft of runway is Type C pavement, with 25 ft of Type D pavement along the outer adges and 25 ft transition sections between the two types of pavement. Taxiway pavements are 75 ft wide, flanked on each side with stabilized shoulders.

Contracts are expected to be awarded next year for service facilities and complete community facilities such as dormitories, hospital, service clubs, sales exchange, theater, chapel, dining hall, recreational facilities, and water and sewage systems.

The second increment of major construction will be a central heating plant and jet fuel storage facilities. Bids will be received for this construction the latter part of next month.

• Engineers in charge—Col. J. B. W. Corey, Jr., Chicago District Engineer, has over-all supervision of the project. R. F. Leeper is chief engineer. N. W. Wightman is chief of the military branch and S. B. Chase is assistant chief. Maj. George L. Schumaker is resident engineer. Holabird & Root & Burgee, Chicago, is architect-engineer consultant on the project.

Zoning Group Upholds Use of Model Home

A Delaware homeowner has lost one round of his fight to bar erection of model houses on a tract adjoining his property in New Castle County. The county Board of Adjustment has ruled the houses do not violate zoning regulations. Carl D. Shields, plaintiff, claimed that the three models built by Welshire Development Co. and W. Percival Johnson & Son, Inc., constitute a commercial operation. This is in violation of residential zone regulations (ENR June 5, p. 117).

The board was supported by an advisory opinion of the levy court, an administrative body with final authority on zoning. Its assistant attorney Michael Poppiti, said: "I fail to see how such use of a house constructed in a residential district which is ultimately owned and occupied by an individual as a dwelling does violence to the zoning code. . . ."

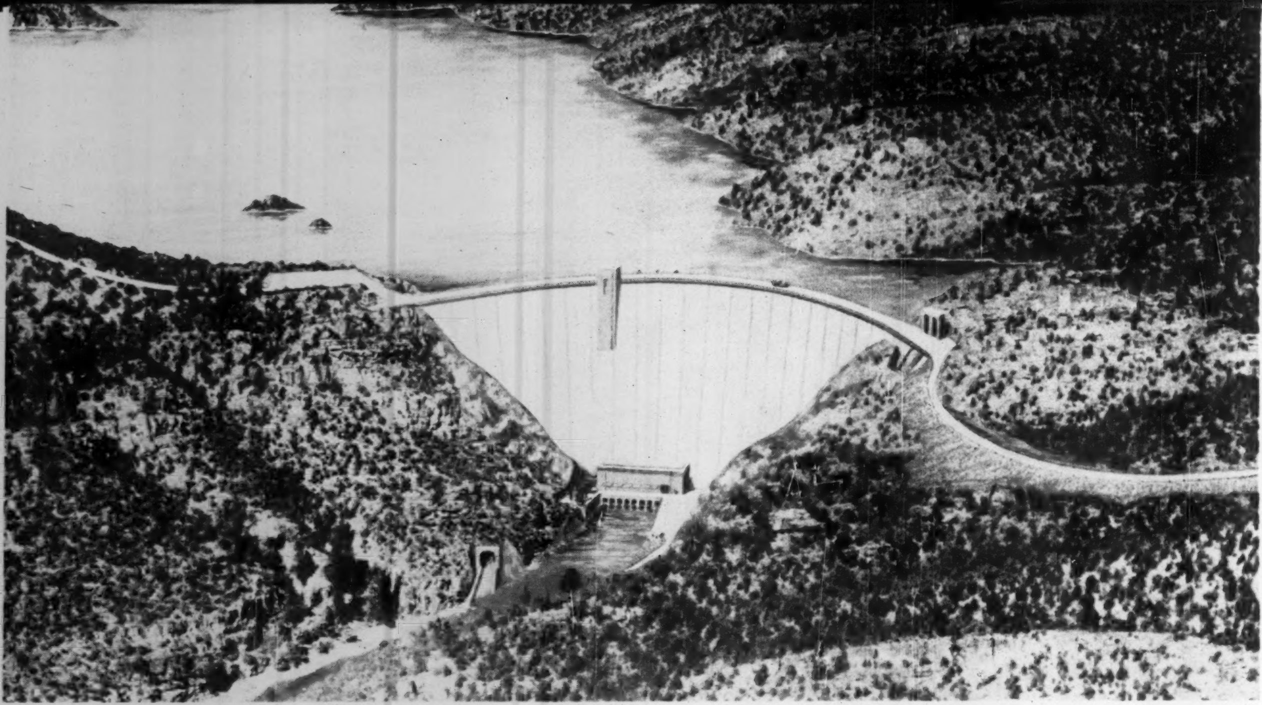
Mr. Shields' second round is pending in court of chancery. His suit claims the model homes violate restrictive covenants contained in Welshire tract deeds. The houses would not be harmonious with the general plan of homes in the subdivision, he contends. Also, the sample homes would create a nuisance because of crowds, noise, inadequate parking facilities, and other conditions.

Pennsylvania to Get First Offshore Natural Gas Well

Pennsylvania has granted an experimental industrial wastes permit for the state's first exploratory offshore natural gas well, to be drilled in Lake Erie. Because the lake is used as a source of water supply, particularly by the city of Erie, the permit was granted under stringent controls to safeguard against possible pollution from brines, oils and gases resulting from the operation.

All polluting materials are to be retained and disposed of so as not to escape into the lake. Casing, connections and pipelines are to be free of leaks. If operations are terminated, the well is to be tightly and permanently sealed. The well will be located one mile offshore and near the Ohio line.

Before granting the permit Pennsylvania investigated requirements of states with offshore operations. Only Texas has any notable gas or oil operations on fresh waters. However, Canada has allowed drilling operations in its portion of Lake Erie for many years.



490 FOOT HIGH ARCH on Upper Colorado is low bid by joint venture sponsored by Peter Kiewit Sons Co.

Flaming Gorge Goes for $30 Million

There's something new in bids on a big job. Merritt-Chapman & Scott Corp. came in last of seven bidders on the Bureau of Reclamation's Flaming Gorge Dam in Utah. The $50 million MC&S bid was nearly double the apparent low bid of $29,602,497 submitted by Arch Dam Constructors of Omaha.

The low bidder is a joint venture of Peter Kiewit Sons Co., Morrison Knudsen Co., Mid-Valley Utilities Co., and Coker Construction Co. Early construction planning will be handled by Kiewit's Omaha office.

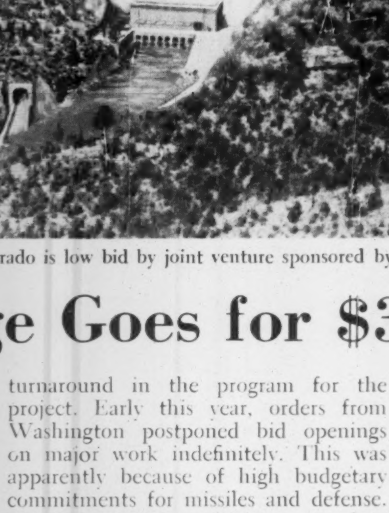
The Arch Dam bid was 12% above the USBR estimate of $25,889,667. Second low bid of $31,754,911.50 was submitted by a joint venture headed by Guy F. Atkinson Co.

Most important bid items were cement and concrete. On 600,000 bbl of cement, Arch Dam bid $4.75 a barrel and the second low bidder $4.80. On the first 500,000 cu yd of concrete, Arch Dam bid $14.50, whereas the Atkinson group bid $22.05. For the 422,000 cu yd in excess of 500,000 cu yd, the Arch Dam bid was still $14.50. But the Atkinson group cut its price bid to $14.04.

Opening of bids for Flaming Gorge Dam marks the start of the second major phase of the Upper Colorado River Project. Construction of Glen Canyon Dam is well under way. And bids were to be opened today on the 26 million cu yd earthfill Navajo Dam.

The bid openings mark a dramatic turnaround in the program for the project. Early this year, orders from Washington postponed bid openings on major work indefinitely. This was apparently because of high budgetary commitments for missiles and defense. But the recession resulted in a complete turnabout and the green light was given for the project bids.

The bids commit the federal government to an increasing level of expenditures for the project. Appropriations for fiscal year 1958 totaled $34 million: $27.3 million for Glen Canyon, $4.8 million for Flaming Gorge and $1.8 million for Navajo. Budget for fiscal 1959 that is now being acted on by Congress totals $66 million ($49 million for Glen Canyon, $10 million for Flaming Gorge and $7 million for Navajo. And to keep the three projects going, expenditures will rise to over $100 million annually during the next five years.



FLAMING GORGE is one of four major dams in Upper Colorado River Project. Glen Canyon is well under way.

• **Seventh highest U. S. dam**—Flaming Gorge Dam on the Green River in northeastern Utah will be the seventh highest concrete dam in the U.S., rising 490 ft above bedrock. It is a thin-arch design with maximum thickness of 150 ft. Crest length is 1,180 ft and crest elevation is 6,047 ft. Volume of concrete in the dam is expected to be 922,600 cu yd.

Most unusual construction feature will be heavy media aggregate separation—removal of aggregate having less than 2.5 specific gravity. All aggregate for Flaming Gorge from No. 8 screen up to 1½ in. size will be so processed. Good aggregate sources are scarce in the predominantly shale area surrounding Flaming Gorge. The source recommended for contractor use has about 20% rock with less than 2.5 specific gravity. This light rock, in the intermediate size range, is subject to damage from freezing and thawing cycles such as would result at high elevations. Accordingly, the specifications call for a maximum of 2% of rock less than 2.5 specific gravity.

Heavy media aggregate processing also is required at Glen Canyon, where the contractor is just putting his heavy media plant through test runs (to be described in an early feature article). At Glen Canyon, only aggregate to be used in exposed concrete is being processed to remove lightweight particles. But at Flaming Gorge all of the intermediate aggregate sizes must be processed through the heavy media plant. Flaming Gorge is much thinner than Glen Canyon and is subject to much more severe climatic conditions.

Concrete cooling is not as much of a problem at Flaming Gorge as at other recent concrete dams. Summer temperatures are fairly moderate and, of course, the dam is relatively thin. Concrete placing temperature is limited to a maximum of 80 F as compared to the more usual 50 F required, for example, at Glen Canyon. Minimum temperature for Flaming Gorge concrete is 40 F during moderate weather and 50 F when the mean daily temperature falls to below 40 F. It is probable the contractor will try to place concrete during all but the most severe winter weather.

Although Flaming Gorge will produce power from three 36,000 kw generators, its major function is to provide river regulation.

Some contracts already are under way at the site. The biggest are: a $504,642 award held by Wangsgaard Construction Co., Logan, Utah, for a temporary access road; a $2,152,956 contract held by Witt Construction Co., Provo, Utah, for streets, utilities and residences for the new project town of Dutch John, Utah; and a $1,213,800 contract held by the Moon Lake Electric Association for providing electric power during the construction period.

Highway System Link Approved in Delaware

A $4 million link in Delaware's interstate highway system has been approved by the State Highway Commission under the 50-50 federal and state funds basis. The road will extend from an interstate highway at a point east of Newark, Del., south to near Warwick, Md.

The highway is scheduled for construction in connection with the present erection of a $6 million high-level fixed bridge over the Chesapeake and Delaware Canal that is to be completed late in 1959. The new freeway will be more than 15 miles long and would be part of the Delaware Memorial Bridge-Chesapeake Bay Bridge high-speed highway system.

Consultants Air Their Problems

Consulting engineers and their problems had the spotlight as the National Society of Professional Engineers held its 24th annual meeting in St. Louis last week.

Fees, errors and omissions insurance and review of consultants' work by other consultants took attention of the meeting as the society's functional group for engineers in private practice held forth.

A report compiling and comparing fee schedules and manuals of practice published in 23 states was discussed. It is to serve as a "suggested guide" in establishing charges for engineering work.

The compilation, which contains charts and graphs showing percentage of construction fees and other types of engineering charges published by various state societies, is still in process of revision but is expected to be made available soon to assist NSPE's state society committees in preparing manuals and fee schedules.

"It is our purpose to make available to state societies the best information, so you will have an opportunity to follow a universal language," said A. C. Kirkwood of Kansas City, who presided as chairman of the functional group. He pointed to a need for finding a formula for engineering charges that would be advantageous to both engineer and client, providing incentive for "keeping costs down and quality up."

Open discussion set forth that the ideal fee formula would safeguard the engineer from losing money when he saves his client money by reducing the cost of the job.

• **Review of consultants' work**—The group moved to clarify NSPE's position on proper conduct of engineers in cases where one consultant draws plans for a project and the client submits the plans to another consultant for review. Rule 45 of the organization's Rules of Professional Conduct provides that the second consultant may check the plans if (1) the client has terminated his relationship with the first consultant; (2) the first consultant consents, or (3) the first consultant knows the plans are being reviewed.

Discussion brought out the definite feeling among members that Rule 45 was not strong enough, that in cases where the work of a consultant is reviewed by another consultant the first consultant should not only be informed but should have access to the reviewer's report and be permitted to reply.

• **Errors and omissions**—Arlow V. Ferry, of Kansas City, led a discussion of professional liability insurance. Victor O. Schinnerer, of Washington, D. C., explained the broad form of engineers' professional liability policy developed in cooperation with NSPE. The policy has only recently become available; it is offered by Continental Casualty Co.

According to John B. McGaughy, an NSPE vice president from Norfolk, Va., the policy has also been approved by the American Institute of Architects subjected to extensive legal review. "We haven't had to use it yet, but I sleep a lot better for having it," he said.

In 14 months, more than 1,000 policies have been sold with premiums of $750,000, but "we've only scratched the surface," concluded insurance man Schinnerer. He said full coverage was provided for expenses of defense in addition to the limit of indemnity; and that coverage was available for professional errors, omissions and negligent acts discovered during the policy period, even though they occurred in years past.

Citing cases in which suits had been decided against architects and engineers concerning buildings constructed years in the past, Mr. Schinnerer said he was aware that many engineers think insurance is unnecessary. "Unfortunately," he said, "we live in an age of change. The trend in third party liability suits since the war is a shocking thing."

An NSPE engineer-industry subcommittee released a tabulation showing that approximately 40,000 professional engineers and scientists are represented by unions in the U.S. The tabulation was described as the first of its kind (see p. 228).

G. Ross Henninger of Cincinnati, president of the Ohio Mechanics Institute, told a general session that the field of the engineering technician should not be regarded as the "dumping ground" for misfit engineers.

"We have too greatly succumbed to the allurement of producing all 'chiefs' whereas we need a lot of mighty good 'Indians' developed on levels of comparable quality," he said.

Mr. Henninger said the nation was rapidly approaching the time when the technological manpower team would be composed of something like "10 engineering technicians and 150 skilled mechanics for each engineer or scientist."

More than 700 engineers attended the national convention. C. A. Dunn of Stillwater, Okla., executive director of the Division of Engineering Research at Oklahoma State University, was installed as NSPE president to succeed Garvin H. Dyer, of Independence, Mo. N. W. Dougherty, former dean of engineering at the University of Tennessee, was cited for his outstanding service to the engineering profession.

PHILADELPHIA
has done its part to
KEEP
PENNSYLVANIA'S
STREAMS
CLEAN

Phildelphia award ceremony draws . . .

Big Name Support for Clean Streams Group

Judging from the turnout in Philadelphia last week for an award presentation, the Water Resources Council's anti-pollution campaign has gained some solid backing. WRC consists of a host of conservation and water industry organizations led by the Water & Sewage Works Manufacturer's Association (ENR June 13, 1957, p. 29).

The council gathered in Philadelphia to present its first national clean streams emblem to that city for marked improvements in the Delaware and Schuylkill Rivers. Shown receiving the award is Mayor Richardson Dilworth (center). Arthur S. Flemming (right), President Eisenhower's new Secretary of Health, Education and Welfare, made the award while new WRC head Willard F. Rockwell of Pittsburgh looked on. Also on the agenda was a presentation of the Pinchot Conservation Plaque to Adm. Milo F. Draemel by Mrs. Gifford Pinchot.

Freeway Proposal Sparks Controversy

A proposal to build a $300 million freeway across the northern part of Pennsylvania has touched off a controversy. The route, to be known as the Keystone Shortway, would extend from Sharon in the west to Stroudsburg in the eastern sector of the state.

City, port and financial interests in Philadelphia are opposed. They argue the road would divert traffic from Philadelphia to New York City, which would result in an economic loss.

To obtain support from other groups, Mayor Richardson Dilworth, of Philadelphia, said that any free route constructed now would endanger the financial structure of the Pennsylvania Turnpike. Therefore, he has obtained the backing of some financial groups who ask that the free road be delayed until the Pennsylvania Turnpike bonds have been liquidated.

Opponents of the new route say that some issues of outstanding Pennsylvania Turnpike Bonds have dropped in price about $2 in the last two weeks, while many other turnpike issues gained. They argue that the freeway proposal caused the Pennsylvania Turnpike bond decline.

However, Turnpike Commissioner Joseph J. Lawler, said the new route would not endanger the turnpike financial operation.

The proposed facility does have the support of Governor George M. Leader, Mayor David L. Lawrence of Pittsburgh and Arthur T. McGonigle. Mr. Lawrence and Mr. McGonigle are the Democratic and Republican candidates, respectively, for governor.

Oklahoma Competition

According to Oklahoma State Highway Director C. A. Stoldt, a record number of proposals and plans, (some 1,500 proposals in all) were sent out to prospective bidders for over $30 million in roadbuilding jobs. Director Stoldt stated that proposals were sent to contractors in seven states who had never bid before. Chief interest by the contractors seemed to center on the Interstate 40 projects, about $5 million in all.

Missile Base Job

ICBM launching needs are disclosed in bid call

The massive and bulky construction needed to launch intercontinental ballistic missiles is revealed in the invitation for bids to be opened July 8 at Francis Warren Air Force Base, Cheyenne, Wyo.

Called for by the Omaha District Office, Corps of Engineers, the job is expected to fall in the $14 to $18 million class. (Other contracts in a $65 million project to convert Francis Warren into one of the nation's major missile bases have dealt with preliminary work.)

Bid spcifications call for six missile-launching buildings and two central fire-control blockhouses.

Each launcher is a 133x104 ft concrete structure. The missile will be stored horizontally, taking up most of the 133-ft length. Directly above the missile will be a 128x27 ft slit in the roof. This will be covered by a mobile concrete slab mounted on tracks and rollers. At shooting time, the slab will be pulled onto a connecting trestle to expose the full slot.

With roof rolled back and the missile in vertical firing position, its base will sit above a wet flame-deflector pit. The pits will be fed water from two underground reservoirs to cool the exhaust flames and protect the pits from damage. The reservoirs will have a combined capacity of 225,000 gal.

The control buildings will be two stories high and measure 73x78 ft. Mostly underground, the part above ground will be heavily barricaded. Access will be through tunnels 7x18 ft in cross-section.

Lincoln Square Project Cleared by Supreme Court

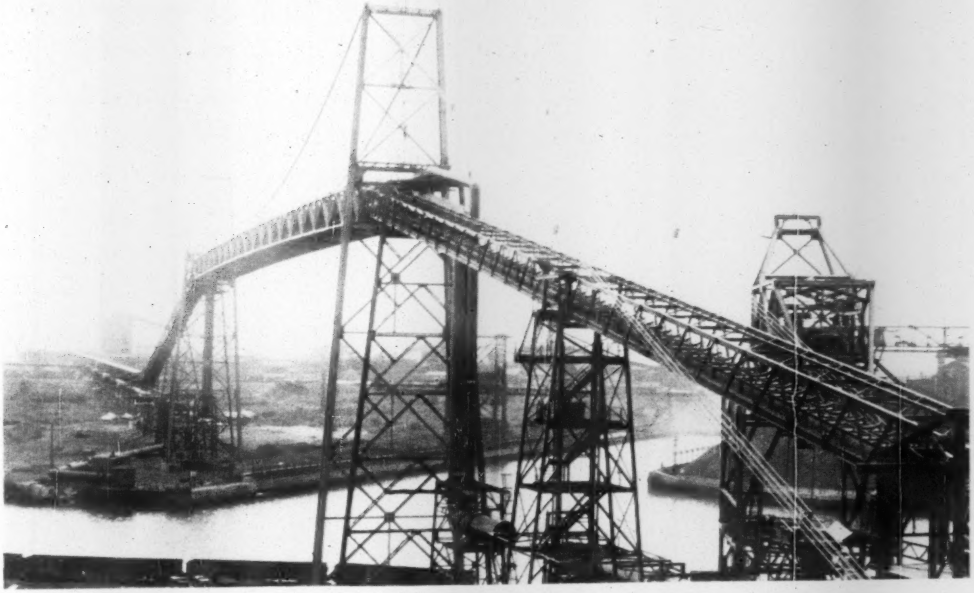
The U. S. Supreme Court last week refused to review a state court decision that New York City's resale of condemned land to Fordham University, a Roman Catholic school, did not violate the traditional separation of church and state. The campus will be a part of the $208 million Lincoln Square redevelopment.

Relocation of the 5,000 families will start soon. The project is seen as a three-year job.

Opponents of the $208 million, 68-acre urban renewal project have not thrown in the towel, however. Their attorney, Harris L. Present, says that further legal action is planned.

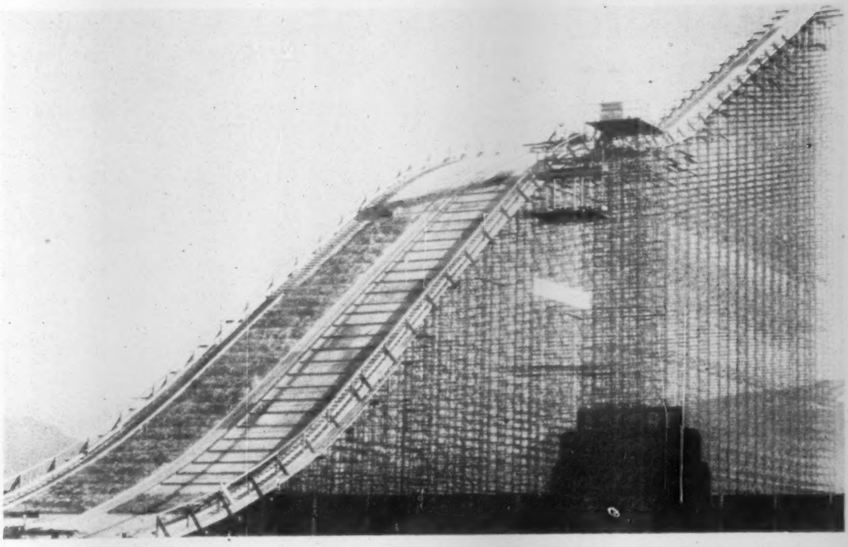
The project has been enlarged by half a block and approximately $3 million since its approval (ENR Dec. 5, 1957, p 168).

Engineering News-Pictures



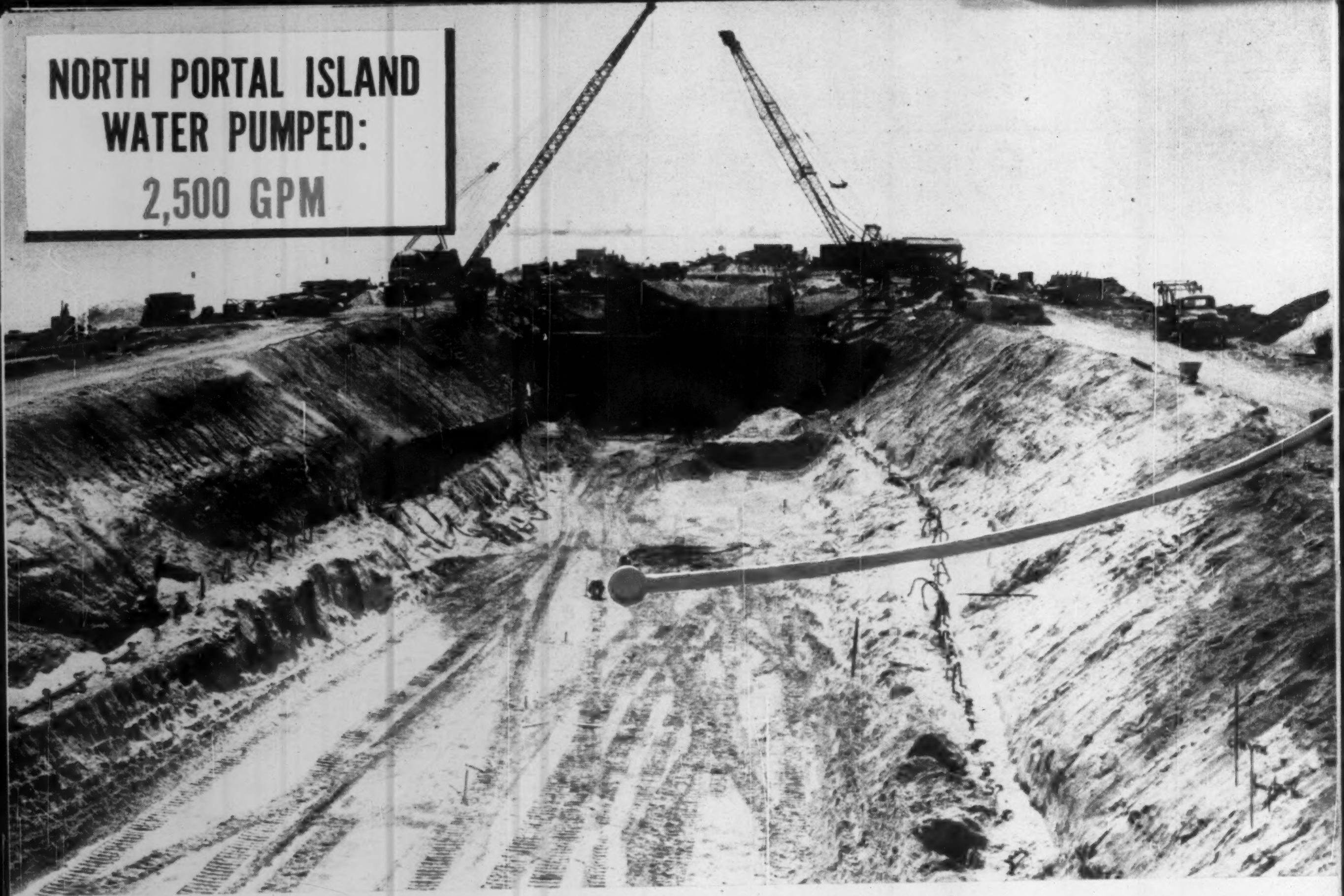
High Bridge Will Carry Coke, Gas and Steam

New high-level suspension bridge across Chicago's Calumet River will carry a high-speed coke conveyor, two gas lines (84 in. and 36 in.) and a 14 in. steam line. Built by Interlake Iron Corp., the structure has a 510 ft central span that clears MHW by 126 ft. The anchors are 405 ft outside of the 190-ft-high towers.

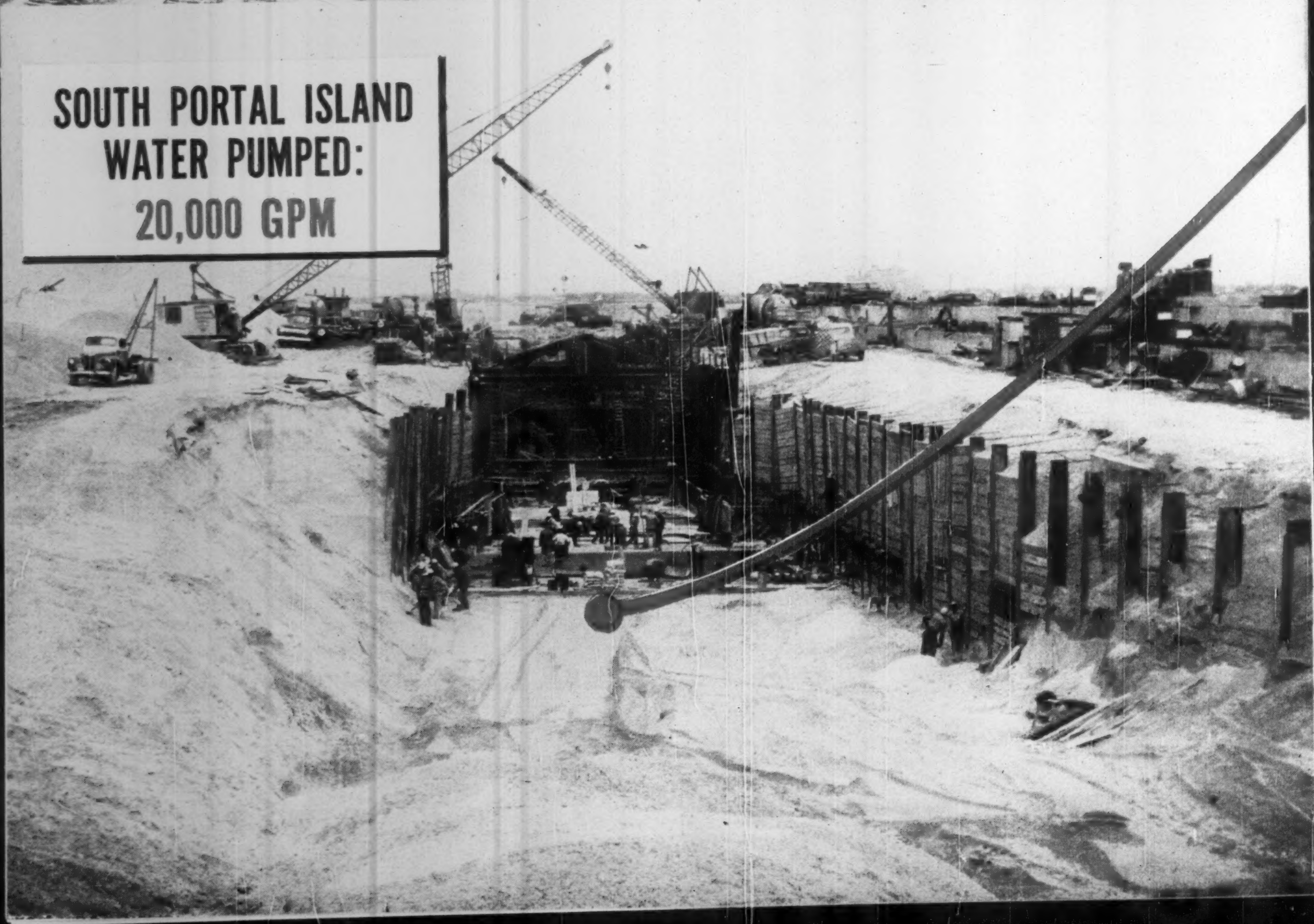


Steel Tubes Make 165 ft "Hill" for Skiers

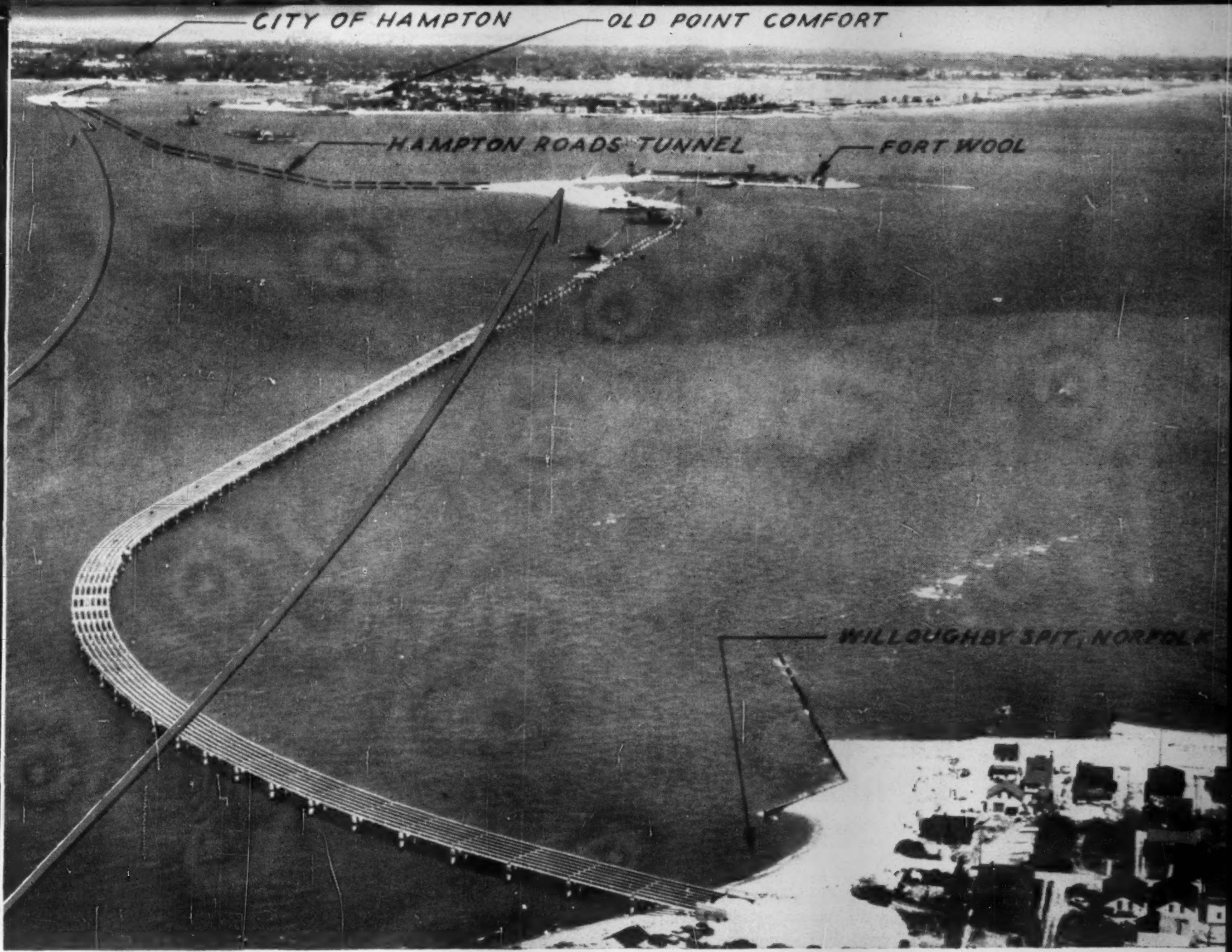
At British Columbia's International Trade Fair, ski jumpers competed on a slope supported by 14 miles of 1 in. dia steel scaffolding. Height of the $14,000 structure is 165 ft over-all, 90 ft at the take-off and 40 ft at the landing hill. The run is 8 ft wide.



NORTH PORTAL ISLAND
WATER PUMPED:
2,500 GPM



SOUTH PORTAL ISLAND
WATER PUMPED:
20,000 GPM



Contractors For Portal Approaches: Tidewater Construction Corporation, Norfolk, Va.
Engineers: Parsons, Brinckerhoff, Hall & Macdonald, New York
Owners: Department of Highways, Commonwealth of Virginia

MORETRENCH WELLPOINTS

Make it Possible to Dig Deep and Dry in the Middle of Hampton Roads

On each of the man-made islands pictured here a deep excavation is being made in the dry for the north and south approaches to the vehicular tunnel which the state of Virginia is constructing under Hampton Roads, between Hampton and Norfolk. Bridges connect the islands to the mainland. The tunnel, running between the islands, will be one and one-half miles long.

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Texas Cites Uniform Bidding

Texas will file antitrust suits this summer against some companies believed engaged in uniform bidding for city materials buying contracts. Attorney General Will Wilson says an investigation also will be started into possible collusion in bidding on materials used in highway work.

The investigation will cover bidding on state, county and local government contracts.

Mr. Wilson indicates, however, he has no evidence or received any complaints of collusion in highway building.

• Four products involved—Antitrust suits to be initiated during the summer will involve bidding practices for electric transformers, chlorine, lime and oyster shell. Mr. Wilson says his investigation covering more than 25 cities, including Dallas, shows that possible collusion on the four products has cost state taxpayers "well over $1 million." The investigations covered bids dating back to 1945.

Mr. Wilson believes that cities have been the chief victims of collusive bidding. He tells of cities that received five or six identical "low bids" on some products. The official reports at least 25 companies are involved so far, some of them national firms.

Elgin Crull, City Manager of Dallas, says that uniform bidding complaints apply more to smaller cities, because bidders are more competitive for the big contracts of large cities.

• Initiated by Austin—The state's inquiry was initiated after the City Council of Austin complained it had received identical bids on transformers for the city-owned electric power system. Of the 800 incorporated cities found in the state, 80 own their own electric power system.

Investigations into the highway phase of possible collusion and additional checks into other types of materials bidding will be conducted with the assistance of the League of Texas Municipalities.

Mr. Wilson says both criminal and civil penalties can be applied to antitrust-law violators. The civil penalty is an injunction against continuing the practice, plus fines of $50 to $1,500 a day for each violation.

Seabees: "Experts in Thievery"

Vice President Richard M. Nixon didn't do himself any harm with the "contractor vote," speaking last week in Washington at the dedication of the Associated General Contractors' new office (ENR June 12, p. 25). Aware that the construction industry is well staffed with former Seabees, he "mused":

"From my own observation, the Seabees ate better, they lived better and they worked harder than any people in the service in the Solomon Islands, where I was located at the same time. They were experts in everything and particularly experts in thievery.

"I can say it was friendly thievery, however, because when they did happen to poach something from some other installation it was for the purpose of providing a little better mess, or something of that sort, for one of the battalions that might be engaged in the 24-hour around-the-clock work that they did in the heroic work of building the airstrips and the other facilities which helped to win the war in the Pacific.

"I know the same thing could be said for the Army Engineers, but I thought we ought to get something in for the Navy today since the contractors and those who are employed by contractors contributed so much.

"May I say, incidentally, that having mentioned the Seabees, I want to point out that I am a Naval Reserve officer, but not in the Seabees so no promotion was involved in all of these kind comments that I have made."

Briefs

• Louisville expressways—A 50 mile network of interstate expressways and Ohio River bridges in the Louisville area has been proposed by consultants, Edwards & Kelcey.

• Keen competition—No less than 22 bids were received recently in White Plains, N. Y., for construction of a small section water line at the Westchester County Airport. Lowest bidder was Baker Brothers Construction Corp. of Elmsford, N. Y., at $32,795.

• Reservoirs attract visitors—The Corps of Engineers announced recently that 84.7 million persons used recreational facilities at its 126 civil works projects in the U.S. during 1957. This is an increase of nearly 20% over the attendance figure of 70.8 million that was recorded for 1956. Far and away the most attractive lake was Texoma (Dension Dam) on the Red River in Texas and Oklahoma, which was visited by 8 million outdoor enthusiasts last year.

Pennsylvania High Court Upholds Home-Zone Laws

Local planning groups and township commissioners in Pennsylvania will continue to have the final word on zoning matters. The state's Supreme Court has refused to rehear a case involving a homebuilder and officials in Easttown Township, Chester County.

Earlier the court held valid an Easttown ordinance requiring one acre home sites having a minimum frontage of 150 ft. With this decision, the court reversed its former position when it ruled the requirement unconstitutional.

Easttown authorities appealed again to the court and gained their point. Bilbar Construction Co. then sought another hearing. It was denied, leaving the latest decision to stand.

Big Road Payments Asked On Irrigation Land Taken

Spokesmen for irrigation districts in the Columbia River Basin last week told the Washington State legislature the districts will expect payment for capital charges, operation and maintenance costs on project lands taken over for highway purposes. The issue was raised at a hearing before the roads committee of the legislature.

William McAnlis, secretary of the East Columbia Basin Irrigation District, told the committee that taking the project land for highway purposes is a major problem for the district.

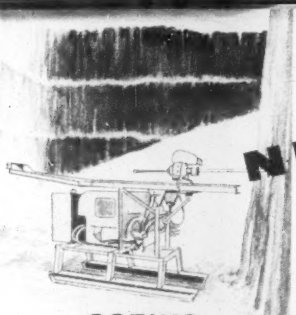
District officials said other agenices that withdraw Columbia Basin project lands for non-agricultural purposes are required to pay construction costs against the land and operation charges for a period of 10 years.

Contractor Bridge Fails At Rocky Reach Damsite

The 280 ft center section of the contractor's 692 ft steel bridge across the Columbia River at Rocky Reach Dam was swept away June 4, causing an 80% shutdown of work on the project.

The river is at flood stage, but its peak flow of 380,000 cfs this year is 40,000 cfs less than last year and 170,000 below 1956. Cause of the bridge failure has not yet been determined. The bridge had been designed to withstand about twice the present force of the river, according to W. N. Evans, supervising manager for Rocky Reach Contractors, a joint venture of Arundel Corp., L. E. Dixon, Hunkin-Conkey, American Pipe & Construction Co. and Guy F. Atkinson Co.

The bridge failure is expected to result in unemployment of 800 of the 1,000 workmen on the job for several weeks, since the structure was the only way to move materials across the river.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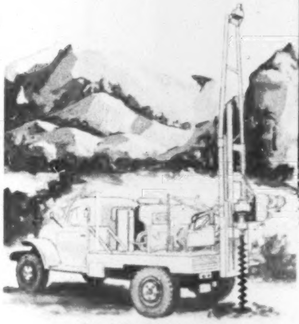
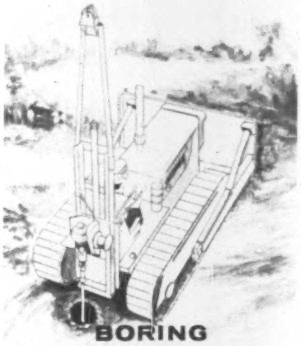

AUGERING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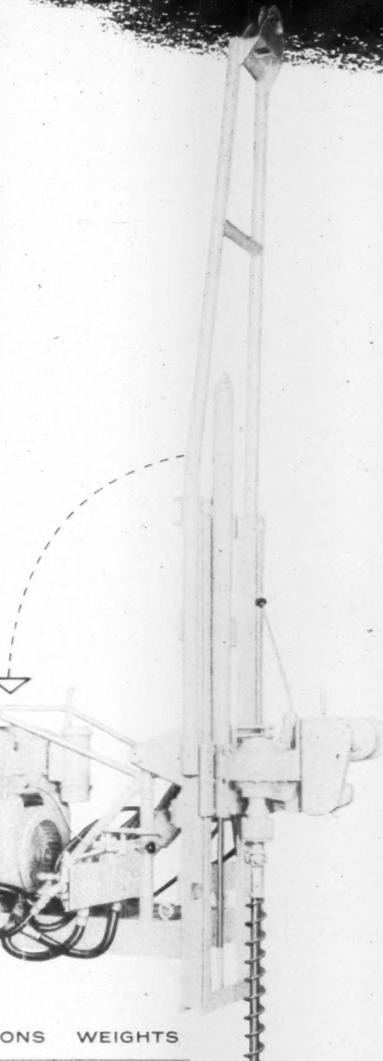

It's designed to do **ALL** these drilling jobs:

Auger Drill to 75 Feet
Core Drill to 500 Feet
Bore Holes up to 24″ Dia.

You name the drilling job and the B-40 "Explorer" can do it—*fast!* It's Mobile Drill's advanced design triumph—light and compact, yet rugged enough to handle the toughest assignments with ease. You can take this agile unit into spots where even a mountain goat might hesitate to go . . . mounts on any ½ ton truck, skid, rubber or crawler tractor.

The "Explorer" is specifically designed to do high-torque continuous flight augering to 75 ft., core drilling to 500 feet, and earth boring up to 24″ in diameter. Use it for both disturbed and undisturbed soil sampling. Quickly convertible from one type of drilling to another.

Never Before—So Many Advantages at So Little Cost

- Mounting Flexibility—compact "Explorer" fits any available carrier, ½ ton or heavier.
- Has independent power plant—4-cyl., 36-hp. air cooled engine. Also available without engine for mounting on PTO-equipped vehicles.
- Powerful hydraulic cylinder delivers 68″ stroke with ram pressure of 7069 lbs. up and 6283 lbs. down.
- Hydraulic rotary head drive is geared to assure positive drilling action. Drilling speed range 62 to 500 r.p.m. with maximum torque of 1740 lbs.
- Simple, conveniently located controls permit one-man operation.
- No clearance problems—drill frame and tower lower to horizontal travelling position (55″), only inches above carrier cab.

APPLICATIONS UNLIMITED

Clay and mineral prospecting • Aggregate prospecting
Subsoil testing for highways and bridges
Foundation testing for heavy structures
Preboring for foundation pilings • Post hole boring
Diamond core drilling • Penetration tests

MOUNTING DIMENSIONS		WEIGHTS
Drill Assembly	Power Assembly	Engine Driven Model 1800 lbs.
Length 37½″ Width 26½″ Height 55″	Length 45⅜″ Width 26½″ Height 40″	Power Take-Off Model 1450 lbs.

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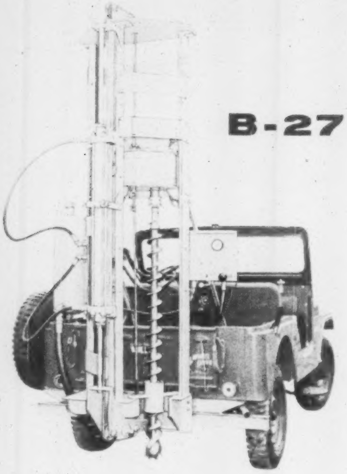


B-27

Lightweight auger designed for exploratory work. Mounts on Jeep or similar PTO-equipped vehicle. Highly maneuverable . . . goes anywhere a Jeep can go . . . moves from job to job with no wasted set-up time. Quick-change feature permits horizontal augering too. Simple, safe one-man operation.

Brief B-27 Specifications

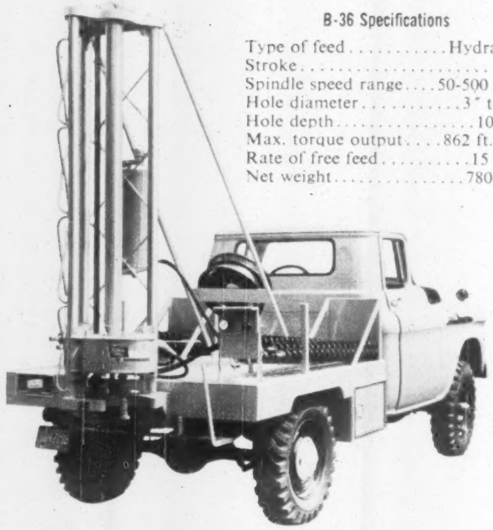
Type of feed	Hydraulic
Stroke	68″
Spindle speed range	45-550 rpm
Hole diameter	3″ to 6″
Hole depth	75 ft.
Max. torque output	862 ft.-lbs.
Rate of free feed	30 fpm
Net weight	800 lbs.

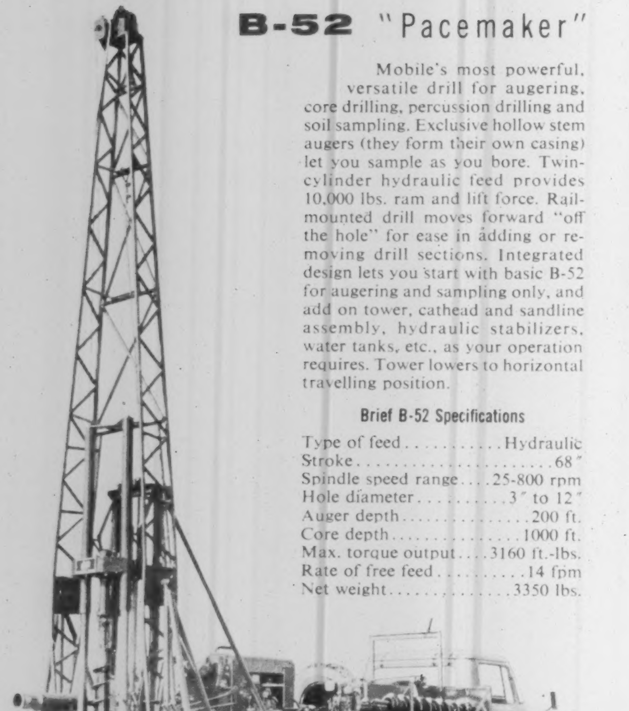
B-36

A rugged PTO-driven auger for drilling to depths of 100 feet. Mounts on any ¾-ton or heavier vehicle. 6-ft. stroke and 8000 lbs. ram and lift pressure enable the B-36 to auger 700 feet in an average day. Separate drill clutch saves wear and tear on vehicle clutch. Centralized control panel permits one man operation.

B-36 Specifications

Type of feed	Hydraulic
Stroke	68″
Spindle speed range	50-500 rpm
Hole diameter	3″ to 8″
Hole depth	100 ft.
Max. torque output	862 ft.-lbs.
Rate of free feed	15 fpm
Net weight	780 lbs.





B-52 "Pacemaker"

Mobile's most powerful, versatile drill for augering, core drilling, percussion drilling and soil sampling. Exclusive hollow stem augers (they form their own casing) let you sample as you bore. Twin-cylinder hydraulic feed provides 10,000 lbs. ram and lift force. Rail-mounted drill moves forward "off the hole" for ease in adding or removing drill sections. Integrated design lets you start with basic B-52 for augering and sampling only, and add on tower, cathead and sandline assembly, hydraulic stabilizers, water tanks, etc., as your operation requires. Tower lowers to horizontal travelling position.

Brief B-52 Specifications

Type of feed	Hydraulic
Stroke	68″
Spindle speed range	25-800 rpm
Hole diameter	3″ to 12″
Auger depth	200 ft.
Core depth	1000 ft.
Max. torque output	3160 ft.-lbs.
Rate of free feed	14 fpm
Net weight	3350 lbs.

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Sauerman News Briefs

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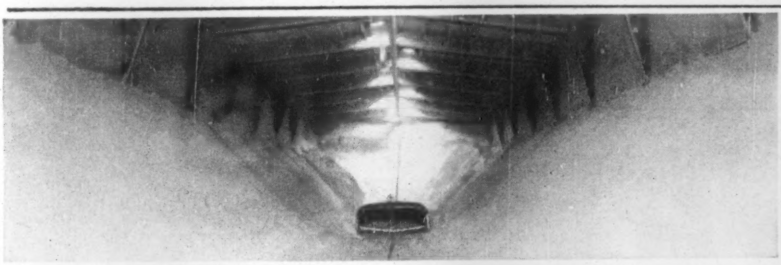
SPECIAL EDITION OF SAUERMAN NEWS

Brief items about the Sauerman Method . . . Crescent DragScrapers
Slackline and Tautline Cableways . . . Durolite Blocks

Sauerman Bros., Inc. • 632 South 28th Avenue • Bellwood, Illinois, (Chicago Suburb)



Self-Unloading Vessels

Sauerman DragScrapers provide efficient clean-up and low-cost cargo unloading capacities from 100 tph. (or less) to over 2000 tph. They are a component part of many ship unloading installations.

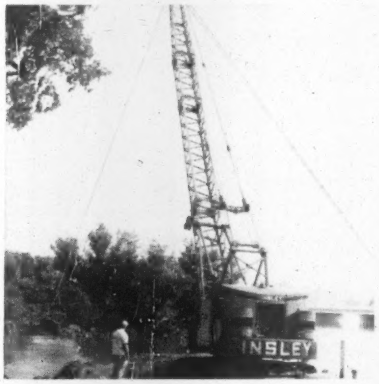
The systems are designed to suit the requirements of a particular vessel and are being incorporated in the construction of new self-unloaders as well as in the conversion of existing vessels.

DragScraper unloading allows maximum space for cargo stowage. The cargo rides low in the hold providing greater stability and increased carrying capacity over cargoes which are hoppered high.

Sauerman ship unloaders are economically handling rock, ore, sand, coal and cement. One man controls the entire operation from a convenient station overlooking the hold and away from any hazards of material or working area.

(Condensed from Marine Brochure MB-1)

DragScraper Uses Island for Parking Lot Fill



An island in the Kalamazoo River was used for parking lot fill by the Harrington Construction Co. of Fennville, Michigan. The job was handled by a Sauerman 3-yd. Crescent DragScraper and carrier assembly used with an Insley WB crane.

The hoisting line of the Insley served as track cable, running from the hoist drum through the middle sheave of the boom tip to a tree anchor on the island. The drag cable was attached to the front chains of the Crescent.

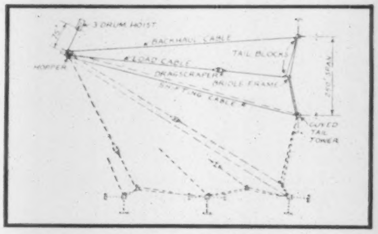
After digging and hauling to bank, the track cable was tensioned to lift the DragScraper and gravity return it to the excavation over 400 ft. away. Round trip took about a minute and a half. The 70-ft. crane boom was supported by two back stay cables leading from the boom tip to two tractors used as anchors.

(Condensed from Sauerman News No. 149.)

DragScraper Supplies Gravel for 82 Miles of Turnpike

More aggregate production was needed by Southern Michigan Materials, Inc. to supply structural and, upon completion, the maintenance and incidental needs for 82 consecutive miles of the Ohio and Indiana Turnpikes.

This demand was met with a new plant and a 5-yd. DragScraper which supplies gravel at the rate of about 275 tph. Digging goes to a depth of 75 to 80 ft. Power is provided by a Sauerman three drum hoist driven by a 325-hp. diesel. The rapid-shifting bridle provides a means of changing the DragScraper's line of operation by placing the tail block attached to the bridle in another position along the 250-ft. span between the two steel tail towers.

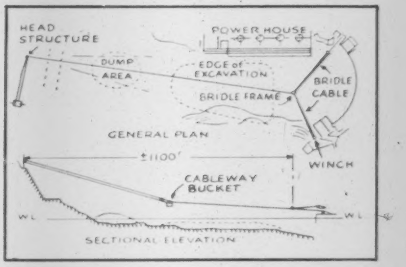


The hoist is pneumatically controlled by the operator from the hoist house. His location gives him excellent visibility of the entire pit and most of the plant.

The parent company, Northwest Materials, Inc., has completely excavated another pit nearby with a Sauerman 2-yd. Slackline Cableway. Northwest also uses a small scraper for stockpiling and reclaiming material from storage.

(Condensed from Sauerman News No. 145.)

De-Rocking a Tailrace



When the Washington Power Co. completed its Cabinet Gorge power plant and dam, an accumulation of rock at the discharge of the draft tubes had to be removed to insure unobstructed flow for the tailrace.

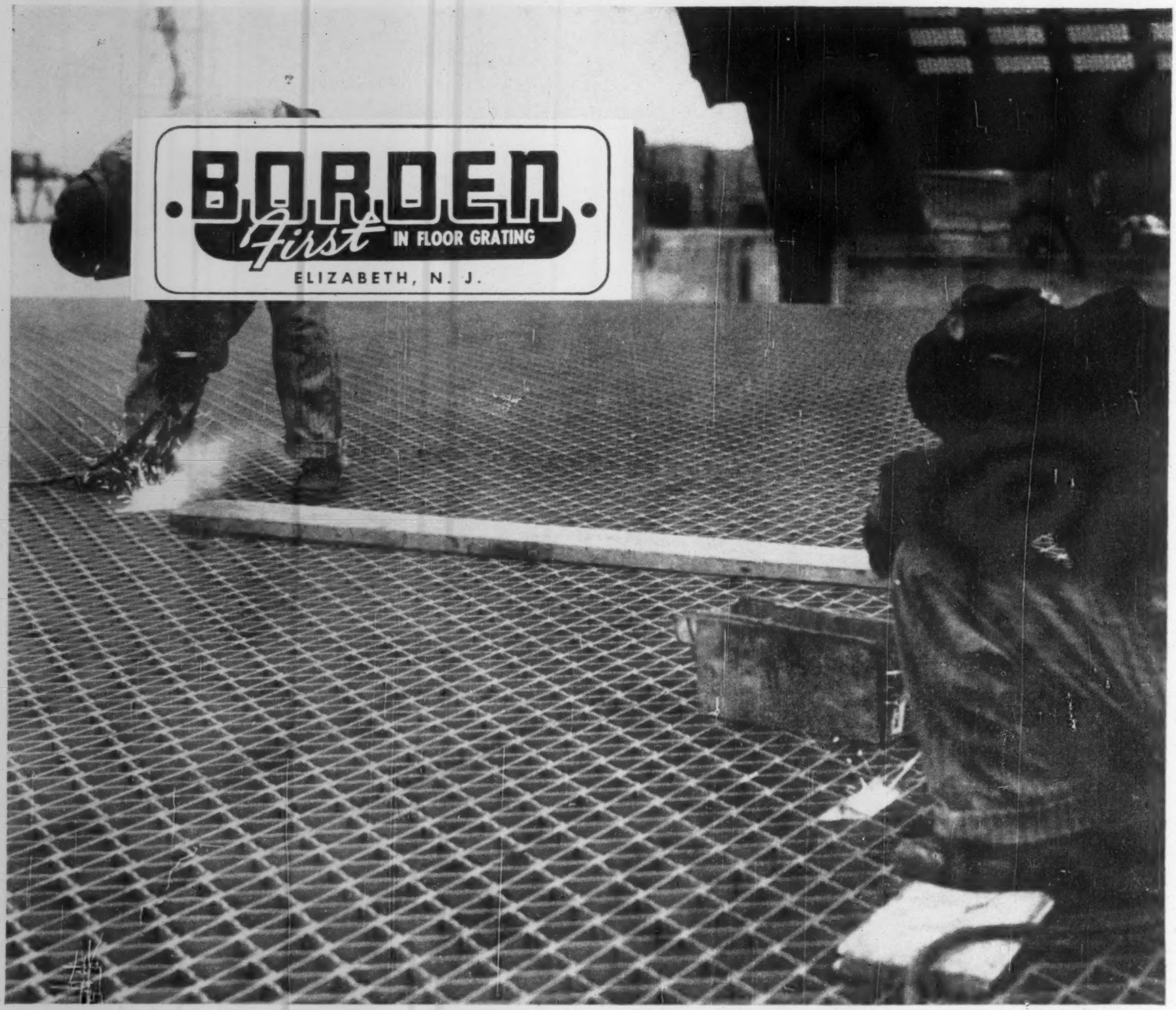
A Sauerman 2½-yd. Slackline Cableway, equipped with a rapid-shifting bridle system, was selected to do the job. Over 28,000 cu.yds. of rock varying in size from 6 in. to 5 ft. have been removed since the Slackline was installed. It is a permanent installation and is used periodically to clear the area in front of the draft tubes.

The Slackline operates on a 1000-ft. span. Material is excavated from 35 ft. of water and conveyed in the 2½-yd. bucket to a waste pile about 150 ft. below the tubular steel head mast. Power is supplied by a hoist located 190 ft. from the mast. The bucket and carrier assembly rides on a track cable, the lower end of which is attached to a rapid-shifting bridle frame controlled by a 10-hp. motorized spool-type winch. The rapid-shifting device permits the bucket's line of operation to be shifted laterally.

(Condensed from Sauerman News No. 143.)

MORE NEWS AND INFORMATION

Issues of Sauerman News giving greater detail about the installations on this page are available on request. For full information, tell us your interest or requirements and ask for catalog. Contact Sauerman Bros., Inc., 632 S. 28th Ave., Bellwood, Ill.



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CITY AND STATE ....

Roadbuilding Gets Rolling

The nation's roadbuilding program is on the track and rolling. You can see this in the record volume of contracts let and the flood of projects out for bids. Highway contract awards have pulled ahead of the pace for a year ago and are maintaining a record level, after three months of heavy going.

Highway agencies have scheduled a record-breaking total of $4.9 billion for 1958 construction.

There are two reasons for this climb:

- Constructive action by Congress to step up the program and advance the dates for allocation of funds.
- The states are now ready to use the funds. They've had time to complete designs and acquire rights-of-way.

Construction men today can review our national road needs and the means to meet them in the light of a year's experience, with a substantial program already under way. You'll find this review on the following pages.

Special Features

Bigger Highway Investment Needed . . 38
Where Does Interstate Stand Now? . . 44
Getting the Facts to Get the Roads . . . 47
Test Road Holds Tomorrow's Answers 52
Electronic Bidding Bows In 71

Highway Cost Reports

Highway Price Trends 1922-1958 . . . 58
State Highway Price Indexes Are Down 60
Highway Price Indexes in 23 States . . 62
Average Unit Price Trends by State . . 64

Other Cost Reports

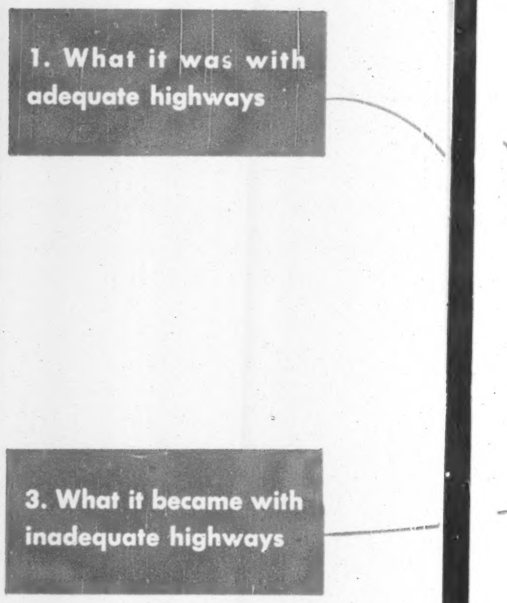
Irrigation and Hydro Costs Drop 94
Building Costs Move Up Again 96
Materials Prices Edge Upward 98
Labor Hammers Out Bigger Gains . . . 98
Machinery Prices Hold Steady 102

Which comes first: the highway or business activity? Can inadequate roads throttle the economy?

Here ENR presents the intriguing relationship of highways to gross national product.

No roads, no travel, no business. It's as simple and stark as that. And there's a good case for the claim that the . . .

Travel Per Unit of



Highway Program Is Big—

Despite the substantial increase in highway expenditures heralded by the Federal Highway Act of 1956, new road facilities will not be provided fast enough to meet the needs of our growing economy unless both the size and the tempo of the program are stepped up further. This will be necessary because, if the economy is to continue to grow at the historically desirable rate of at least 3% a year, highway transportation—and therefore new road facilities—must grow at an even faster rate.

This challenging fact, as well as some suggested figures on the needed amount and rate of highway construction, emerge from a study the author has recently made, comparing the growth pattern of highway facilities with that of traffic and of general economic growth as measured by the gross national product (GNP). Among the conclusions to be drawn are the following:

- Adequate highways increase the GNP by making it possible to move a greater volume of goods economically.
- Highway traffic growth at about a 5% annual rate is the minimum desirable for some time at least, if a healthy annual rate of growth of the economy of 3% or more is to be achieved economically.
- Road construction expenditures, which have increased 10% a year in past periods, should continue to increase at a 10% annual rate until the backlog of road needs is overcome. Then it may be possible to reduce the rate of growth somewhat.
- Highway expenditures should be scheduled to reach an annual outlay of $7.75 billion by 1962, and $12.5 billion by 1967 compared to the $5.2 billion spent in 1957.

Transportation has always supported and promoted business growth, and highway transportation, since the post World War I period, has been particularly effective in this respect. Because of the specialization that has occurred in business and production, highways have become a part of their assembly lines. Today, goods travel miles between processing steps where formerly they only traveled feet. The result is that more vehicle miles are required per unit of business done, with the consequence

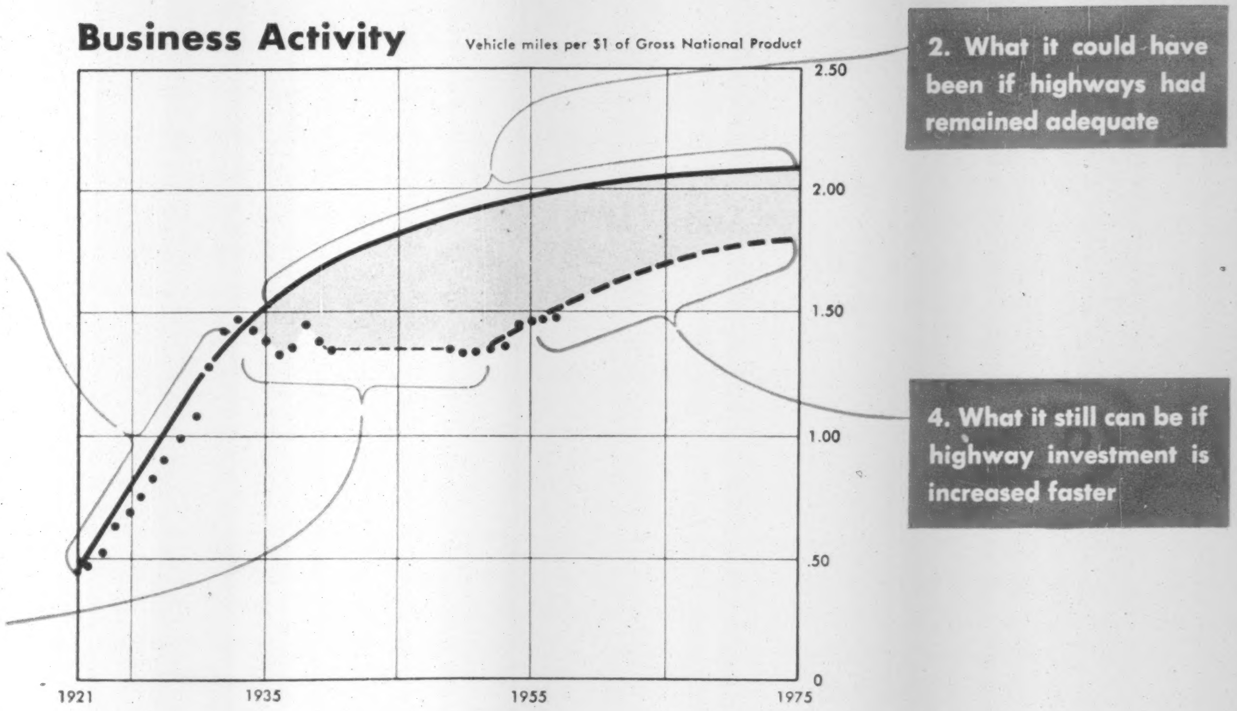
Meet the Author . . .

Robinson Newcomb

Construction has been his industry since 1928 when he began work for Herbert Hoover in the Department of Commerce. He's worked for the War Production Board, Federal Works Agency, Office of Defense Mobilization and the President's Council of Economic Advisers.

He is the co-author of "Stabilizing Construction: The Record and Potential" (McGraw-Hill). He is now a consulting economist in Washington, D. C.

Business Activity



2. What it could have been if highways had remained adequate

4. What it still can be if highway investment is increased faster

But It's Not Big Enough

that highway facilities must be increased at a faster rate than business itself increases.

But this fact has not always been recognized. All of us know that the economy cannot grow without electricity, or water, or steel. We recognize the need for continuing expansion in the capacity for supplying such essentials. We are glad to see money borrowed and stocks and bonds sold for this purpose.

We know also that the economy cannot grow without adequate traffic facilities. But we have not faced up as straightforwardly to the fact that, if the economy is to grow, highway capacity must grow, and this growth must be financed.

• Effect on the economy—It is easy to illustrate how inadequate facilities limit transportation capacities and, therefore, the volume of goods that can be moved comfortably. The high cost of traffic delays, traffic jams, and traffic accidents is well known. The deterrent effect of such costs on the growth of the economy is not as well recognized. We know that adequate highway facilities encourage business and residential construction just as we know that they encourage more traffic. Nevertheless, we hesitate to appropriate funds for expanding highway capacities.

Actually we have done better in the past than we are doing today. Table I, (see p. 42) shows that, in terms of 1957 prices, we spent 2.27 cents on highways per vehicle mile traveled in 1921. Expenditure dropped to 1.18 cents per mile traveled in 1929. It rose again and stayed above '29 levels through 1933 and then dropped. It has not equaled 1 cent since 1939 and, despite the increases in highway expenditures since 1950, it still is only a little above 0.75 of a cent per vehicle mile.

If column 4 and 6 of Table I are compared, it will be seen that, after expenditures per mile dropped below 1¢, growth in traffic in relation to volume of business done ceased or even became negative.

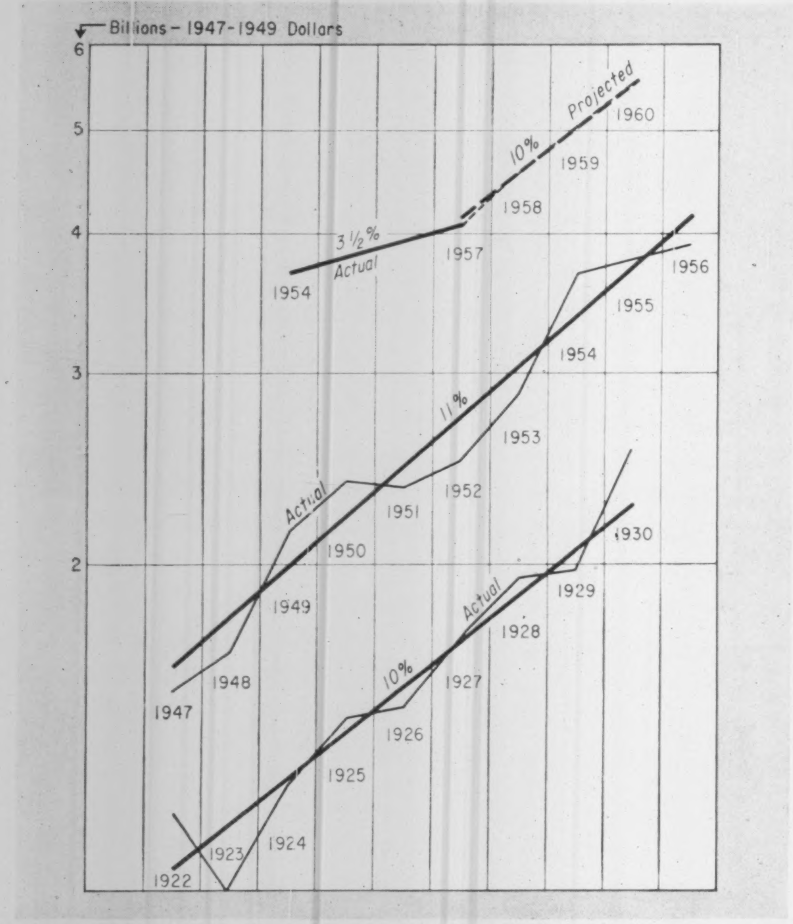
In 1954, expenditures exceeded 0.75 of a cent per vehicle mile for the first time since 1940, and traffic per unit of business done started to increase. But, as Table II shows, capacity, as measured by depreciated investment in our road facilities, has not grown as fast as traffic in the decade since 1946, so enough highways continued to be crowded to serve as a check on traffic growth.

It is useful in helping to place matters in perspective to calculate what the volume of highway traffic might have been had highway construction not been sharply curtailed in 1933. The chart at the head of this article suggests how traffic might have grown had highways been kept adequate. The heavy line suggests the number of vehicle miles per unit of GNP we might have achieved. Dots show what actually occurred. If the highway program is pushed, traffic will grow again, but it may never reach the level it might have reached under optimum conditions.

The chart suggests that, had highways been adequate, traffic now might be something over 2 vehicle miles per dollar of GNP. With a GNP in 1957 averaging over $430 billion, this would have meant a total traffic of over 850 billion vehicle miles, or about 30% more than did occur. At 10¢ per vehicle mile, this by itself would have added over $20 billion to the GNP reported for 1957.

The economy might have been much bigger even than this with adequate

. . . Bigger highway investment needed to serve our nation's growing economy



GROWTH RATE of highway construction expenditures has been higher in the past than it has been in the recent period from 1954 to 1957.

highways, because some of the inefficiencies and high costs, which result from inadequate highways, would be missing in a freely moving traffic economy. Some of the money that now goes for paying insurance bills, for instance, and comes back in the form of repairs for accidents or compensation for loss of life or limb, would be spent for more and better automobiles and trucks to use the better highways. The money would be spent for goods and services to add to the economy rather than to replace goods and services lost to the economy. This could mean also more expenditures for gas and oil, for motels and for vacation trips. Such added expenditures could engender still more activity, and help raise our standard of living—as expenditures that go to pay for accidents cannot do.

• **How traffic may increase**—The chart may serve another useful purpose. It may help us judge the rate to which highway traffic might grow in the future under optimum conditions for both the GNP as a whole and for traffic. It suggests that by 1975, under optimum conditions, we might drive about 1.85 miles per constant dollar of GNP. If the GNP comes to approximately $800 billion by that time in 1957 dollars, this would give us nearly 1.5 trillion vehicle miles as against 642 billion for 1957. That would be a traffic growth of over 130% in 18 years, and a growth of about 5% per year in vehicle miles. The growth in the immediate future, say from now to 1965, might be something over 5%. After 1965, the annual rate of growth might drop to about 4%.

When compared with historical rates, these rates are very low. From the good employment year of 1926 to the good employment year of 1956 (including depression years) highway traffic grew over 7.5% per year, compounded annually, despite the absence of adequate roads. From the good employment year of 1952 to the good employment year of 1956 it grew over 5%, compounded annually, again with inadequate roads.

The rate of growth with adequate roads should be higher than without adequate roads. So, even though it be argued that under *current* conditions the rate of growth of highway traffic may decline, it nevertheless remains true that, under *optimum* conditions, the rate of growth will be greater than under congested conditions. The difference should be enough to maintain the rate of highway growth at 5%, or possibly more, for some time to come.

This rate of growth is consistent with the expected rate of growth in the GNP as a whole. A growth of 3½% for the economy as a whole is generally considered a healthy rate. The $800 billion GNP, assumed for 1975 (in 1957 dollars), calls for a growth rate of about 3½% per year. So the projected rate of growth in highway traffic is only slightly more than the projected growth of the economy as a whole. It should be noted, however, that if traffic continues to grow faster than the economy, the 5% projection in traffic growth for the next 5 to 10 years, under an active highway program, may be the minimum permissible for a growth of 3½% in the overall economy during this period.

• **Needed rate of roadbuilding**—If it can be assumed, then, that highway traffic should grow roughly 5% for about the next decade, to permit a growth of 3½% in the economy as a whole, what does this mean to the business of building highways? What rate of highway construction is necessary to permit the economy and traffic to grow at a healthy rate?

Strangely enough, this question has never been asked by governmental agencies, except once and incidentally by the Joint Economic Committee of the Congress. The most that has ever been done has been to ask highway engineers what highway construction was necessary to provide adequate highways in their areas.

These questions have brought varying answers. The tabulations of highway needs compiled in the Clay Committee inquiry in 1954 were far different from the tabulations prepared by state highway officials two years earlier, and far different from the response to the inquiry of the Bureau of Public Roads made in 1957. The traffic assumptions made by the highway departments ~~in~~ their calculations for 1957, for instance, were 15% greater than the assumptions made three years earlier in 1954.

The differences in the responses were, in considerable part, due to the differences in the attitude of the engineers compiling the estimates. This was inevi-

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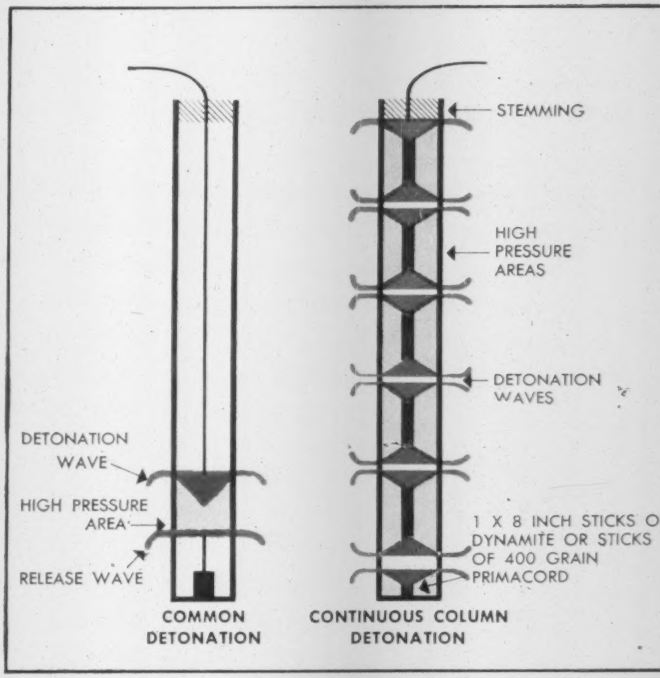
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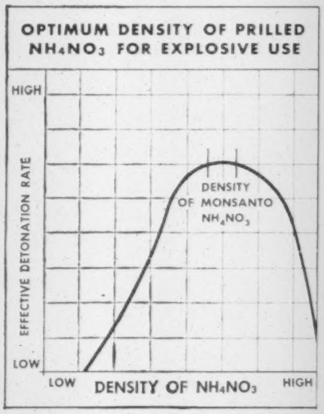

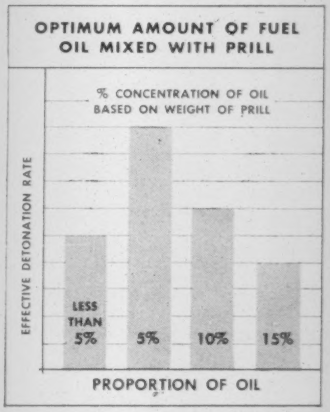

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. . . Highway capacity is not keeping up with the growth in traffic

table since there were no careful studies of economic requirements and prospects upon which the answers could be based; also because relatively little is known about the basic economics of highway transportation.

So, it is no surprise that the estimated highway needs reported by the states to the Bureau of Public Roads show considerable variation in requirements per capita, per dollar of income, and per dollar of business done, in relation to the urban and rural characteristics of the states.

The rates at which highway construction expenditures have grown in different periods are charted on the preceding page. During the 20's the rate of growth was approximately 10%, compounded annually. Spending grew approximately 11% per year from 1947 to 1956 but, as Table II shows, even this volume of expenditure did not keep highway capacity abreast of the growth of highway traffic. Traffic grew almost 10% more from 1920 to 1930 than did highway capacity. If grew 15% more from 1947 to 1956 than did highway capacity.

The fact that a rate of growth of 10% per year was not adequate to keep highway capacity abreast of the growth of highway traffic during the 20's or from 1947 to 1956 might suggest, at first glance, that a growth in expenditures of at least this amount, and possibly more, would be necessary in the future. Such an expansion of highway expenditures would result in an annual outlay by 1962 of about $7.75 billion (in 1957 prices) and by 1957 of almost $12.5 billion.

However, such an analysis would overlook the size of the existing backlog, and the fact that highway traffic grew far faster than the total volume of business during the 20's (by over 14% per year) and after World War II (by over 6%)—and faster than it is expected to grow in the future. Once the backlog of needs has been met, the volume of

Table I: Here's the Relation of Vehicle Miles to Highway Construction and Gross National Product

Year	(1) Vehicle Miles (Billions)	(2) Highway Construction (In Billion of 1957 Dollars)	(3) Gross National Product (In Billions of 1957 Dollars)	(4) Construction (Cents per Vehicle-Mile in 1957 Prices)	(5) Construction (Cents per $1 of GNP in 1957 Prices)	(6) Vehicle Miles per $1 of GNP (1957 Dollars)
1921	55.0	1.248	121.5	2.27	1.04	.45
1922	67.7	1.406	140.6	2.08	1.00	.48
1923	85.0	1.160	158.7	1.37	0.74	.54
1924	104.8	1.483	157.7	1.42	0.94	.66
1925	122.3	1.709	172.6	1.39	0.99	.71
1926	140.7	1.753	181.1	1.25	0.98	.78
1927	158.5	2.037	183.8	1.29	1.11	.86
1928	172.9	2.297	183.8	1.33	1.25	.94
1929	197.7	2.334	193.8	1.18	1.20	1.02
1930	206.7	3.006	175.7	1.46	1.57	1.08
1931	216.2	2.999	162.7	1.39	1.85	1.33
1932	200.5	2.665	138.0	1.33	1.93	1.45
1933	200.6	1.849	134.9	.92	1.37	1.49
1934	215.6	1.930	148.9	.90	1.30	1.45
1935	228.6	1.709	164.0	.74	1.03	1.39
1936	252.1	2.538	186.3	1.00	1.35	1.35
1937	270.1	2.435	197.0	.90	1.23	1.37
1938	271.2	2.940	188.5	1.07	1.54	1.44
1939	285.4	2.924	203.5	1.03	1.44	1.40
1940	302.1	2.842	221.6	.94	1.28	1.36
1941	333.4	2.052	256.8	.61	.79	1.30
1942	267.1	1.098	291.4	.41	.38	.92
1943	206.7	.680	323.9	.29	.20	.68
1944	211.6	.554	348.0	.26	.16	.61
1945	248.9	.621	340.1	.25	.18	.73
1946	340.7	1.267	301.1	.38	.43	1.13
1947	370.6	1.808	300.5	.48	.59	1.23
1948	397.6	1.973	314.0	.50	.63	1.26
1949	424.5	2.511	313.3	.59	.80	1.35
1950	458.2	2.793	341.6	.61	.82	1.34
1951	491.1	2.772	367.6	.57	.77	1.34
1952	513.6	2.937	381.1	.57	.78	1.35
1953	544.4	3.364	397.0	.61	.84	1.37
1954	560.9	4.353	389.7	.78	1.12	1.44
1955	603.4	4.498	417.4	.74	1.07	1.45
1956	628.4	4.625	430.3	.73	1.07	1.46
1957	642.*	4.840	434.4	.76	1.13	1.48*
1960 Projected	[1]745	.....	480.0	....	....	1.55
1965 "	[1]950	.....	570.0	....	....	1.67
1970 "	[2]1175	.....	680.0	....	....	1.73
1975 "	[2]1430	.....	805.0	....	....	1.78

* Est.

[1] Assuming growth 5% per year in traffic, 3.5% in GNP, 1957-1967.

[2] Assuming growth 4% per year 1968-1977 in traffic, 3.5 % in GNP from 1967.

Table II: The Relation Between Travel and Road Investment

Year	Depreciated Investment (1938-40 = 100)	Travel in Vehicle Miles (1938-40 = 100)	Ratio Investment To Traffic
1921	9.9	19.2	51.6
1922	13.5	23.7	57.0
1923	17.1	29.7	57.6
1924	19.4	36.6	53.0
1925	23.1	42.7	54.1
1926	27.0	49.2	54.9
1927	31.3	55.4	56.5
1928	35.9	60.4	59.4
1929	41.5	69.1	60.1
1930	47.1	72.1	65.3
1931	54.7	75.5	72.5
1932	62.6	70.1	89.3
1933	68.5	70.1	97.1
1934	71.8	75.3	95.4
1935	76.4	79.9	95.6
1936	79.4	88.1	90.1
1937	86.3	94.4	91.4
1938	91.9	94.7	97.0
1939	100.4	99.7	100.7
1940	107.7	105.6	102.0
1941	113.9	116.5	97.8
1942	116.6	93.3	125.0
1943	114.9	72.2	159.1
1944	111.3	73.9	150.1
1945	107.7	87.0	123.8
1946	104.1	119.0	87.5
1947	102.7	129.5	79.3
1948	103.1	138.9	74.2
1949	104.1	148.2	70.2
1950	106.7	160.1	66.6
1951	110.0	171.6	64.1
1952	113.3	179.4	63.2
1953	116.9	190.2	61.5
1954	122.2	195.9	62.4
1955	131.1	210.8	62.2
1956	140.0	219.5	63.8
1957	149.2	224.3	66.5

Table III: Costs of Getting Adequate Roads in 20 Years

(In Billions of Dollars)

Construction Costs by systems	Total 1956-65	1966-75
Interstate	20	18.0
Other primary	24	34
Secondary	12	18
Other State	4	6
Other streets and roads	23	34
	83	110
Maintenance, debt service, police costs, etc.	39	44
Total costs	122	154

* Assuming a traffic growth of 5% for 10 years, and then 4% for ten years.

highway construction may not have to grow much more than traffic—that is, much more than possibly 5% per year.

It is difficult to come to an engineering conclusion as to the existing backlog of need. The studies made by the various highway departments and by others tend to lump present and future needs together. From the standpoint of those making the study, the description of the need as being for current latent or near future potential traffic is relatively unimportant. Today's roads must be built for tomorrow's needs in any case. The problem to be faced is how much highway capacity will be needed at given times in the future, and how can those needs of the future be met, if at all—not just what is needed for today's traffic.

Messrs. Farrell and Paterick of the Bureau of Public Roads have provided us with an analysis of the existing investment in highways, which suggests that, as of January 1, 1957, depreciated investment was approximately $45.3 billion. If we take the ratio of vehicle miles to depreciated investment in 1938-40 as 100 (Table II), the figure for January 1957 is approximately 66.5. To bring the capacity, as indicated by investment, up to 100, or to $68.5 billion, would require an additional expenditure of something on the order of $23 billion.

Actually this approach may understate the size of the backlog, because such a high percentage of the present need is urban and suburban. The cost of bringing these facilities up to par will cost more per unit of travel than the cost of bringing most other facilities up to par. So, a $23 billion backlog figure, for today's needs only, may err more on the low than the high side.

• The cost of catching up—If all highways were suddenly brought up to date, how much would it cost to keep them abreast of a growing economy?

We spent on highways from 1954-1956 an average of about ¾ths of a cent per vehicle mile traveled for construction purposes (in 1957 prices), and apparently about maintained the capacity of the highways in relation to traffic during this period. If traffic grows at 5% per year, it would average about 850 billion miles a year for the decade ending 1967. At ¾ths of a cent per vehicle mile, this would come to about $63.5 billion. This, plus the $23 billion suggested as necessary to bring the highways up to current needs, would give a total of over $86 billion.

As a check on this figure highly competent engineers were asked to make a study of reports submitted to the Bureau of Public Roads and come up with a conclusion as to what these reports indicated was needed to meet the type of growth suggested here—that is, a growth of 5% for the next decade. They were given no clues as to what a statistical analysis might suggest. They worked entirely from engineering reports on the current conditions of highways. They came to the conclusion that to bring highways up to date over a 20-year period, and to equip them to handle traffic rising at about 5% per year, would require an expenditure of about $83 billion, in 1957 prices, during the first 10 years, and about $110 billion in the following 10-year period of time.

The $83 billion indicated expenditure for the first 10 years is about the same as the $86 million total obtained by the previous different approach. In any event, to reach the $83-$86 billion goal, highway construction would have to grow by 10%, compounded annually, during the current decade.

As to the succeeding 10 years, assuming an expenditure of ¾ths of a cent per vehicle mile and a traffic growth of 4% per year, the required construction outlay would be about $99 billion. If we assume standards rise enough during the next 10 years to create an obsolescence not now foreseen, equal to roughly the 1957 shortage, of about $23 billion, this would require a construction volume during the 1968-1977 decade of about $111 billion, compared with the $110 billion estimate of the engineers.

Assuming an average growth in the entire economy of about 3.5% per year, this would be about 1.3% of the GNP 20 years hence, compared with about 1.2% of the GNP in 1929.

Should it prove feasible to put the roads into tip-top condition and capacity in 15 rather than 20 years, the suggested $11 billion average annual construction rate for the first half of the second decade would be raised to possibly $12.5 billion or more per year—or a total of about $125 billion per decade.

The figures of $83-$86 billion for the first decade and possibly $110-$125 billion for the second decade are, of course, only orders of magnitude to suggest the volume of highway construction needed for a growing economy. But the figures can be useful as rough guides to what highway expenditures should be.

How the $83 billion and $110 billion figures derived by BPR might be allocated among the various classes of roads is indicated in Table III.

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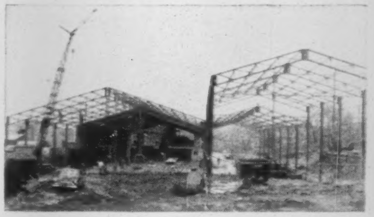

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Where Does the Interstate Stand Now?

On the first of next month, the federal government opens up an added line of credit for the states. It will apportion to each state its share of $2.5 billion of fiscal 1960 money for the Interstate Highway Program.

This is $900 million jump in funds and a six-month gain in time, accomplished by the new Highway Act of 1958. The original act of 1956 authorized $2.2 billion for 1960. But only $1,6 billion would have been available—and that not until this coming December—from the Highway Trust Fund under the pay-as-you-go limitation that the new act suspended for fiscal 1959 and 1960.

Thus federal funds for the Interstate Highway System are coming along nicely—at least for the immediate future. And they join other federal money already in the mill, including an additional $200 million authorized for fiscal 1959 and quickly apportioned to bring that year's total to $2.2 billion.

Which leaves the question: Is federal-aid money being turned into construction at the required pace?

It is. Nationwide the program is going at a physical rate that—**if kept up**—should see completion of the highway network in the 13-year period originally set for it.

- Two states, California and Ohio are already waiting to get at 1960 money.
- Obligated funds—money spent or concretely committed by the states—are growing at what BPR considers a desired and expected rate.
- As of June 1, about 15 states were obligating money apportioned for fiscal 1959.
- And as of the same date, obligated fiscal 1958 money averaged out to 99% nationally—with one month still to go.

Here's how the 90% federal share is spread, 23 months after the passage of the act of 1956, according to BPR preliminary figures:

- $1.9 billion-plus has been obligated—committed or spent—for advertised contracts, awarded contracts, contracts under way and completed contracts. This accounts for 4,358 construction miles (one fully completed mile of road equals roughly two miles of constructions).
- Over $1 billion has been obligated for preliminary engineering and right-of-way.
- Over $1.1 billion has been programmed for specific projects but not yet obligated.

That makes a total of over $4 billion in federal-aid funds accounted for by programming and obligation covering 6,239 miles of construction.

There's an unprogrammed balance of $990 million of the total federal money apportioned through fiscal 1959. This includes the additional $200 million for 1959.

Some of the projects in the Interstate Highway System were authorized prior to passage of the 1956 act. When these are included, construction completed as of June 1 totals 1,525 miles. The state-federal cost was $377 million, BPR reports.

• **What about later?** The new act didn't just raise authorizations for fiscal 1959 and 1960. It also increased the figure for 1961 from $2.2 billion to $2.5 billion.

With income exceeding outgo for the first few years of the program, as expected, a so-called surplus of about $1 billion in the trust fund will be able to cover almost all of the increase for 1959 and 1960. But the 1961 fiscal year will demand action by Congress. By then, the pay-as-you-go limitation again will be in force and the surplus will have disappeared. Then, it's either come up with new or additional forms of appropriations to pay for the program or cut it down and stretch it out.

ABC Got More Too

The federal-aid primary and secondary systems and urban extension programs—known as ABC—also got a lift from the Highway Act of 1958. Authorized funds for fiscal 1960 were increased to $900 million and to $925 million for 1961.

But the most quickly felt action was apportionment of an additional $400 million for fiscal 1959, which had already been credited with $875 million.

The states are acting fast to turn this money into construction. They have to, for the $400 million must be put into contracts before December 1, 1958 and construction completed prior to December 1, 1959.

Within six weeks after passage of the act on April 16, over $131 million of federal money had been programmed and over $56 million additional was obligated for actual construction, contracts advertised for bids and contracts awarded.

The traditional 50-50 state and federal matching ratio for ABC programs isn't being used for the emergency $400 million. The money is provided to the states on a two-thirds federal and a one-third state matching basis.

The act also authorizes $115 million from which the states can borrow to meet up to two-thirds of their one-third share. This will be repaid by deductions from later federal apportionments for the program.

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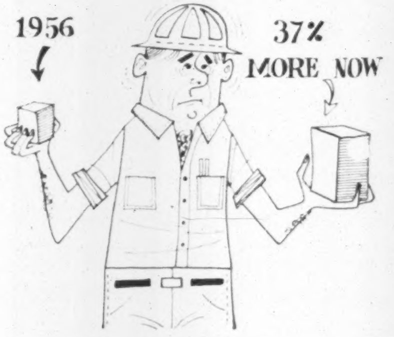
Five Far-Reaching Studies Are . . .

Getting the Facts for the Roads

We don't know now all we need to know to complete the federal highway program. Bulk of the information needed is expected to come from five important studies now being made by the Bureau of Public Roads. These studies are authorized by the Highway Act of 1956, implementing instrument of the Interstate Highway System. As Congress gets this information, it will be able to enact whatever further legislation is necessary.

Here's a report on what the studies cover and where they stand now.

1 How Much to Complete the Interstate System?



The pricetag has been and will continue to be a big question. Right now it's 37% higher than the first estimates.

BPR is making a series of reports to Congress showing revised estimates of what completion will cost. The first one was made in January, and it formed the basis for apportioning federal funds for fiscal 1960. Other reports are due in 1962, 1966, 1967 and 1968.

As of now, the estimate for remaining cost to complete the system is just over $32 billion—$29 billion is the federal government's 90% share. That will take the total cost to $37.6 billion. This breaks down to $33.9 billion for the federal government, $3.7 billion for the states.

The first cost study covers a total of 38,548 miles. It doesn't include 1,452 miles cut from the original 40,000 by shorter and better routes, or the extra 1,000 miles later tacked on by Congress.

The increased cost estimate of 37% showed up when state-by-state figures were compiled for the first report. The increase is attributed to four major factors:

- Traffic is expected to be 15% greater in 1975 than a previous forecast indicated. That's the year the highways are being designed for. This means more traffic lanes and other facilities, adding 5% to the construction needed.
- A revision of the law requires that local traffic needs be given equal consideration with the interstate. This resulted in a 63% increase in some facilities, such as grade separations and interchanges, adding 15% to the estimate.
- New items, such as signs, included in the roads account for an increase of 3%.
- Construction cost indexes rose 12%.

2 Should the States Be Paid for Tollroads?

Reimbursement is a $6 billion question. Object of this study is to determine whether the government should reimburse the states for tollroads and free roads that are part of the interstate system—but only those that were completed or put under construction between 1947 and 1957.

This report, made last January, supplies basic data to Congress but does not carry any BPR recommendations. However, Sinclair Weeks, Secretary of Commerce, has declared his opposition to reimbursement for tollroads. He says he has an open mind on the question of free roads—while insisting that the rest of the program be completed before any reimbursements are considered.

The cost involved in possible reimbursement is substantial, $6.09 billion. From this could be subtracted $174 million for depreciation, which brings the figure to consider to $5.92 billion: $2.52 billion for tollroads and $3.4 billion for free roads.

Mileage involved runs to 10,859. As of September 1957, 1,955 miles had been fully completed to interstate standards, and 8,904 miles had partial construction that met interstate standards. The total mileage breaks down to 1,950 miles of toll and 8,909 of free roads.

The uncompleted mileage figure represents construction contract miles, not actual length of the road. (Two construction miles—one for grade, one for pavement—are roughly equal to one actual mile.)

3 Who Pays for How Much of the New Roads?

This is an intricate problem for BPR and Congress. How much, for example, should truckers pay for roads?

Congress instructed BPR to get the answers to three major questions:

- How much will it cost to provide highway facilities for each type of highway user, such as passenger cars and trucks?
- What benefits would each type of user get from the right kind of highways?
- What benefits will non-users such as municipalities and property owners, get from the new highways?

The answers will be used by Congress to determine an equitable tax rate for the different factions.

Final report on this study is due in March 1959. But a recommendation has been made to change this to January, 1961, because of delays on the test road of American Association of State Highway Officials. The test road will supply important data for this study.

The study is broken down into three phases: data-collecting, analysis, and interpreting the findings and preparing the report.

Phase one is about done. It includes five major efforts:

- A nationwide sample census of the number of vehicles in each type and weight group.
- A comprehensive survey of traffic volume and weight composition on federal-aid roads.
- State-by-state estimate of highway needs, rural and urban, in a form suitable for analysis to determine costs and benefits by vehicle types.
- Experimental studies of vehicle operating costs under traffic congestion and the benefits that would come from good highways.
- Studies of the effect of highway improvements on property values, land use and the general public.

BPR is continuing its efforts to come up with incremental design standards and costs. That is, the design and construction necessary for passenger cars only, and for increasingly greater axle loads—and the cost for each increment.

Helpful here will be results from test roads in Maryland, Idaho (sponsored by the Western Association of State Highway Officials) and AASHO's Illinois project.

4 A Federal Role in Highway Safety?

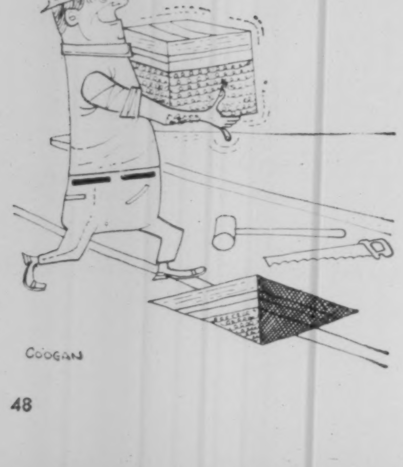
SLOW
S
CURVE
STOP
CAUTIO

BPR is expected to report to Congress by March 1959 on what, if anything, the government can and should do to make roads safer (Section 117).

The bureau is examining the work done by many other groups and also is doing some original research. Accident causes are getting special attention from an investigating team of engineers, medical and social scientists. There are also studies designed to find out how much speed has to do with highway accidents, and what kind of economic losses accidents produce.

One study of unusual scope seeks to uncover why some communities have low accident rate, while others have high ones. Object is to isolate the characteristics that make for highway safety or the lack of it.

5 What About the AASHO Test Road?



This is the largest and most expensive ($22 million) highway experiment ever undertaken. It's designed to produce engineering facts and figures that can be used in the design and construction of highways and bridges for years to come. One objective here is to determine optimum vehicle weights and sizes for federal-aid highways. (See page 52 for a complete story on the test road.)

The AASHO test in Illinois is closely allied with BPR's study on allocation of highway costs. Results of the test will probably indicate a need to modify many present conclusions about cost distribution for various types of highways.

BPR's job on this test is simply to do what it can to help expedite things.

The test road is expected to be in operation early this fall.

8 more jobs prove Foster Pipe Piles

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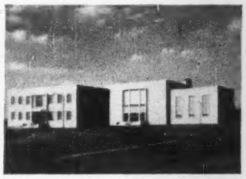
A. S. Wilkstrom Inc., Skaneateles, N.Y.

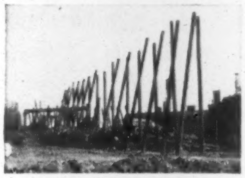
Florida Power and Light Co. Plant
Murphy Construction, Palm Beach

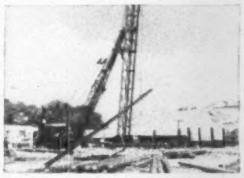
New York Thruway Connecting Link
Carlo Bianchi & Co. Inc., Framingham


Jersey City Sewage Treatment Plant
Garden State Constructors & Assoc.

Brazos River Bridge, Hearne, Tex.
J. A. Raines Construction Co., Okla.

Mississippi River Bridge, Lansing, Ia.
Brennan Brothers, LaCrosse, Wis.


Connecticut Turnpike Feeder
C.W. Blakeslee & Sons Inc., New Haven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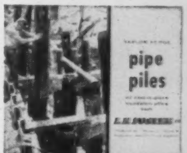

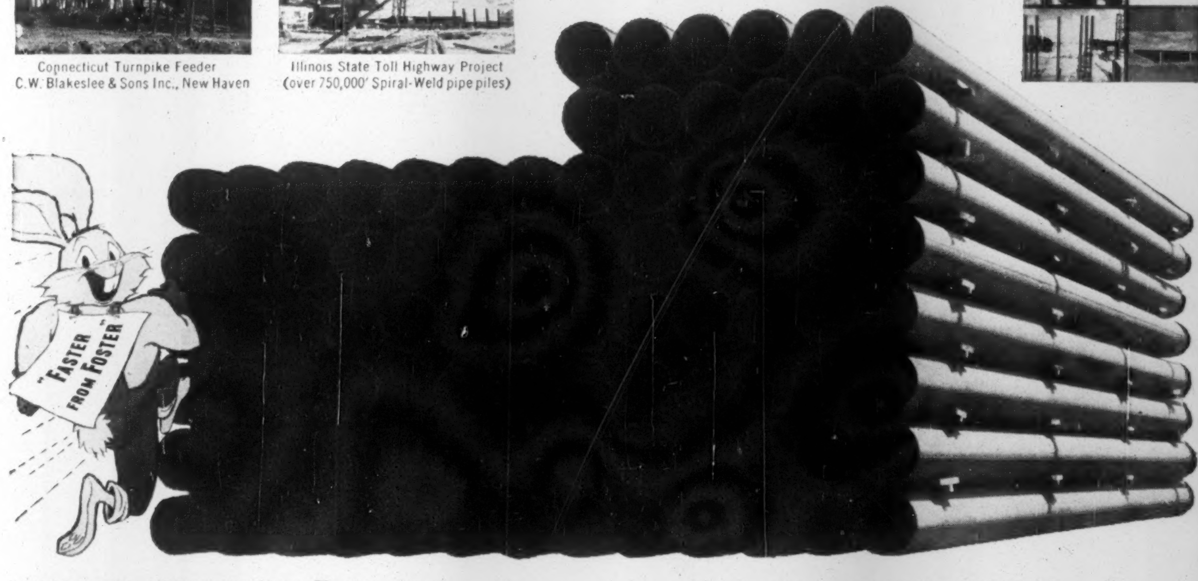

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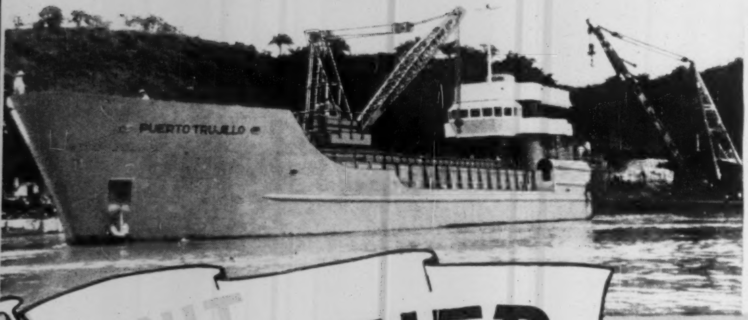

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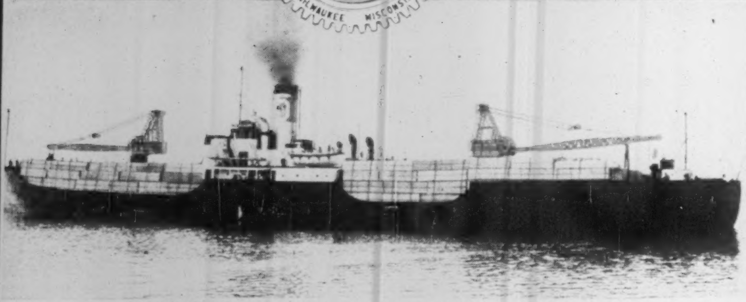
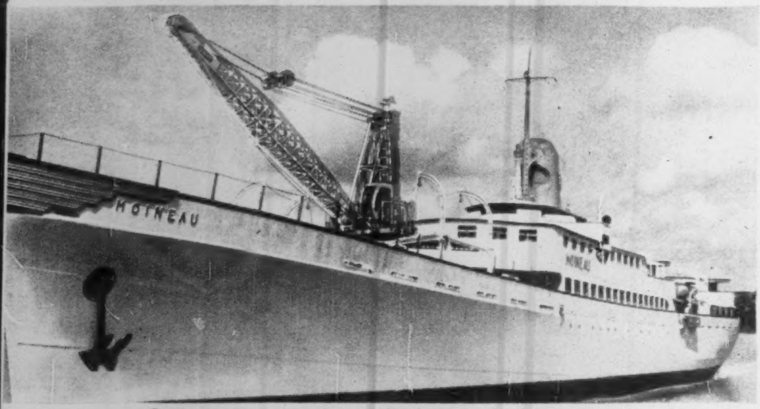


S. S. CYNTHIA OLSON, one of a fleet of lumber schooners.



Passenger-cargo vessel operating between foreign ports.

UNIT Mariners, both Diesel and electric powered, are being used extensively in a variety of offshore operations. The cranes are designed specifically for mounting on stationary pedestals and critical components are designed to provide high safety factors in boom, boom suspension, roller path, hook shoes and brackets, turntable and A-frame. They are of ample strength to resist shock loads resulting from rolling, pitching or listing of the vessels.

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Tenders serve platforms while bobbing up and down with their cargo suspended from the crane hook.

Ships and barges load and discharge their cargo while listing from wave motion and change in cargo position.

Unlike the ratings of conventional crane upper structures, the UNIT Mariner is rated in accordance with specific factors of safety outlined in Requirements for Cargo Gear of the American Bureau of Shipping.

To alleviate shock loading, Diesel powered Mariners are equipped with torque converters and variable speed electric powered machines are furnished with eddy-current couplings.

Reading & Bates Tender serving offshore platform.

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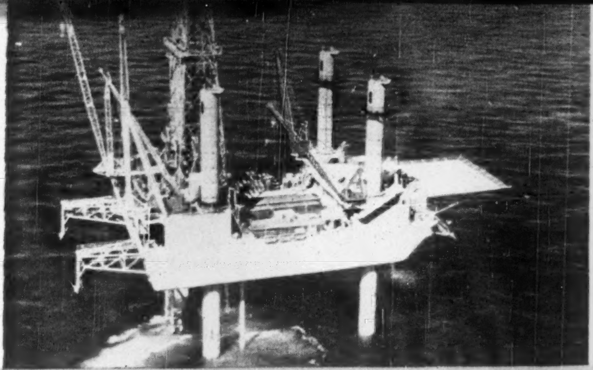

Drilling Rig MR. GUS II owned by C. G. Glasscock Drilling Company operating off coast of Louisiana.

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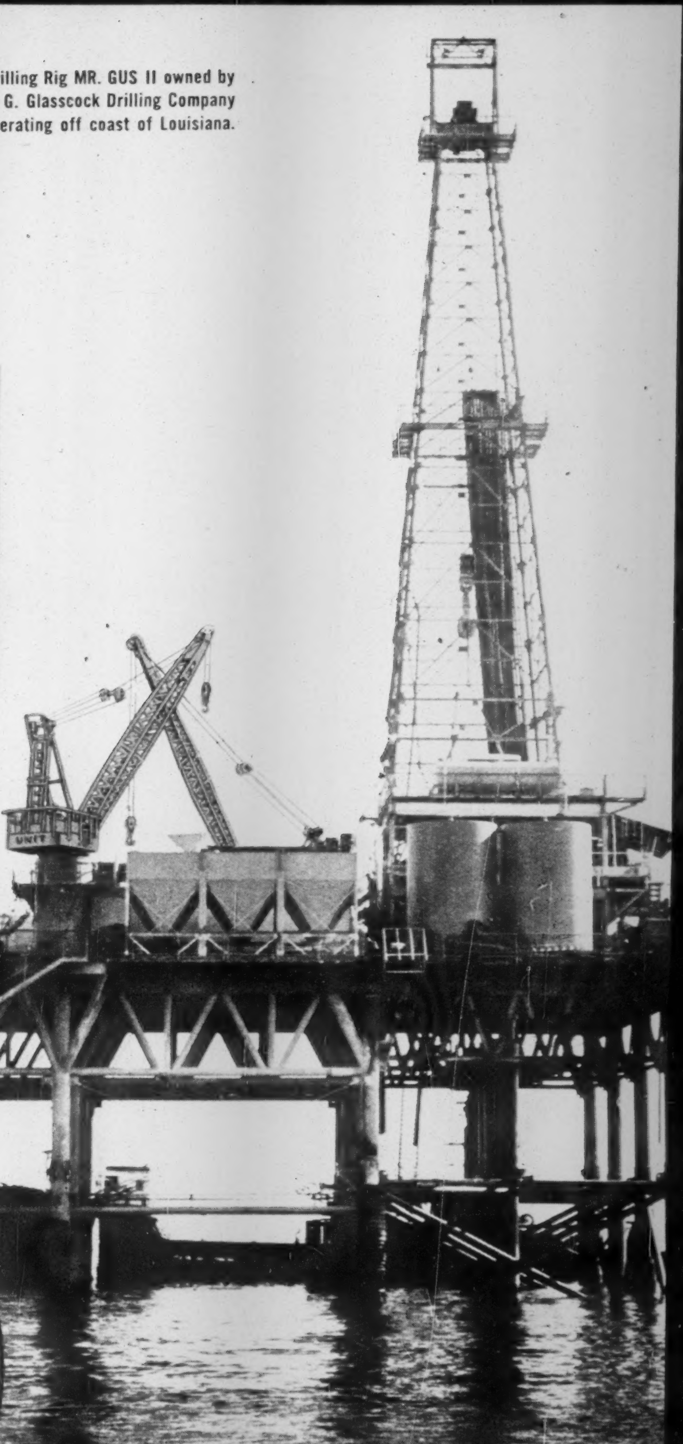
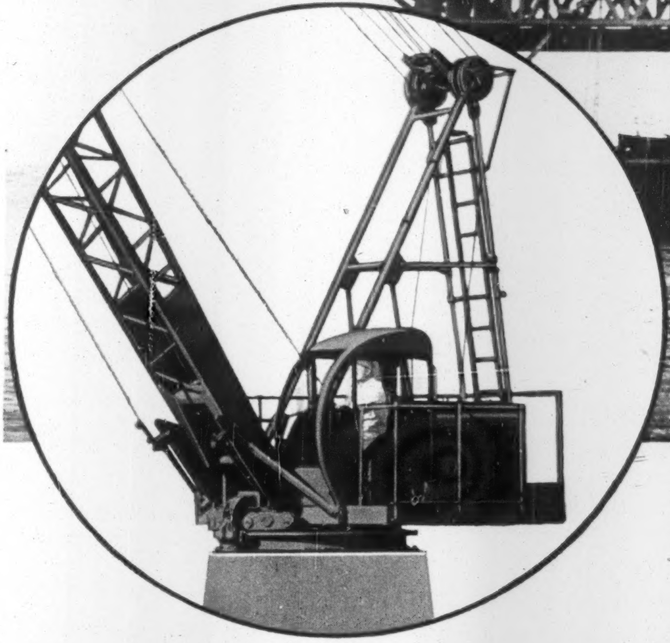


Shoreline's Rig No. 7 operating in the Gulf of Mexico.



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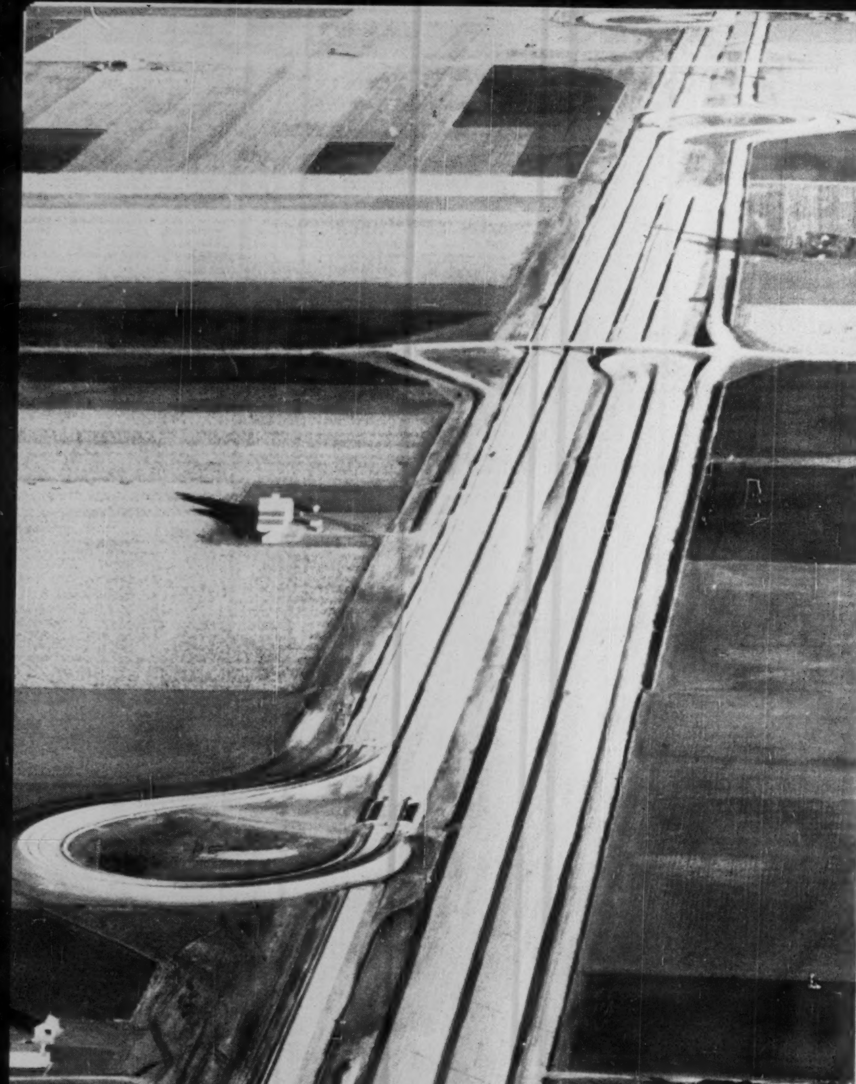


Test traffic will start early this fall on Illinois test loops

Over 700 construction men and

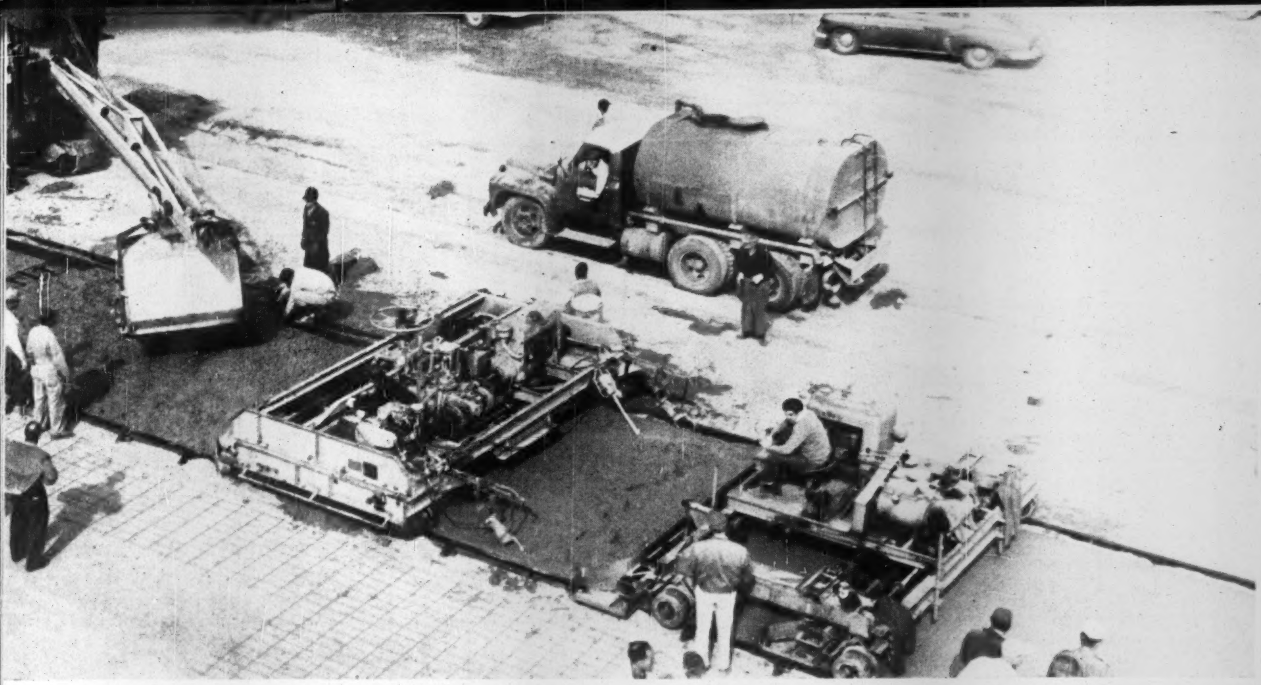
King-Size

Test traffic is scheduled to get under way early this fall on the $22 million highway research project between Ottawa and La Salle, Ill., sponsored by the American Association of State Highway Officials. Construction is being pushed 10 hours per day, 6 days per week. Completion of the test pavements is scheduled for August 1. It's the largest such experiment ever tried, in terms of space, cost and time.

The test loops (picture) are separated sections of a four-lane divided highway lying in an east-west direction. All test sections of pavement are contained in the tangents of the loops, which are connected by banked turnarounds. Both tangents of four loops are 6,800 ft long. The other two loops have 4,400 ft and 2,200 ft tangents, respectively. The two north lanes and east turnarounds of each loop are asphaltic concrete, while the south lanes and west turnarounds are portland cement concrete.

• **Objectives**—Primary objective of the research project is to determine the significant relationships between the number of repetitions of specified axle loads and the performance of different thicknesses of uniformly constructed, rigid and flexible pavements (ENR June 20, 1957, p. 25).

The ultimate goal of the AASHO road test is to secure sound, logical and unassailable engineering facts and figures that can be used in the design and



researchers will be involved in AASHO's $22 million highway research project

Test Road Holds Future Answers

construction of highways and bridges for years to come.

A sizable number of engineers, scientists and technicians are now testing every phase of construction as the project progresses. They will gather and analyze millions of pieces of data as traffic testing gets under way this fall. During the two-year test, an estimated 150 scientists, engineers and technicians will be needed to collect, record and analyze data.

Construction operations will reach a maximum this year, with the contractor forces reaching a peak of about 500. The test staff will reach a peak of 200 to 225 this year.

• **Sponsors**—The road test is being financed by the 48 states, District of Columbia, Hawaii, Puerto Rico, Bureau of Public Roads, Automobile Manufacturers Association and the American Petroleum Institute, with the cooperation and assistance of the Department of Defense. The project is administered and directed by the Highway Research Board of the National Academy of Sciences—National Research Council.

• **Test traffic**—Test vehicles will be standard makes of trucks and tractor-semi-trailer combinations. All vehicles operating in any one traffic lane will carry the same specified axle load. These will range from 2,000 to 30,000 lb on single axles and from 24,000 to 48,000 lb on tandem axles.

Trucks will operate 18 hours a day, six days a week for two years at a constant speed of 30 mph and in a carefully controlled transverse pattern. They will be driven by Army Transportation Corps troops assigned to the project by the Department of Defense.

When construction of the project's six "test loops" was halted for the winter last November, the roadway embankments were completed and topped with 130,000 tons of sand-gravel subbase. Some of the turnarounds were paved and 12 of the 16 test bridge spans were essentially complete. Major work this year includes construction of the 24 ft wide flexible and rigid test pavements.

• **Test sections**—There will be a total of 836 separate "test sections" of pavement. This represents about 200 different combinations of surfacing, base and subbase.

Rigid pavements range from 2.5 in. to 12.5 in. in thickness. Some are placed directly on the compacted earth embankment; others have 3 in., 6 in. or 9 in. of granular subbase. Welded wire fabric reinforcement specified for some test pavements varies from 10 gage to zero gage, spaced 6x6 in. and 6x12 in.

Flexible pavements range from surface treatment only, to 6 in. of asphaltic concrete, including both surfacing and binder courses. They are being laid on crushed stone bases ranging in thickness from zero to 9 in.; and on granular subbases from zero to 16 in. thick.

About $1 million worth of instruments will be used on the project to measure, record and analyze various physical phenomena as the test pavements are subjected to loads. Most of the instruments were developed specifically for the project, and a considerable part of their cost represents developmental work.

Some measurements, like curvature of asphaltic surfacing and deflections at the surface and subsurface interfaces under full-speed traffic, will be made with transducers located within the pavements. Other measurements, like strains and deflections in rigid pavement, will be made with gages attached to the edges and surfaces of the slabs. Automatic recording equipment installed in vans will be located alongside the test pavements and plugged into surface junction boxes. The vans will be moved from section to section, as required.

• **Pavement profiles**—Some measurements will be made with devices that move along the roadway surface. These include an automatic "Benkelman Beam" and longitudinal and transverse profilometers. The Benkelman Beam is attached to the test vehicle. It will measure surface deflections near the dual wheels of a truck moving along the roadway at 3 mph. Measurements can

. . . Big test road's six loops have 836 test sections

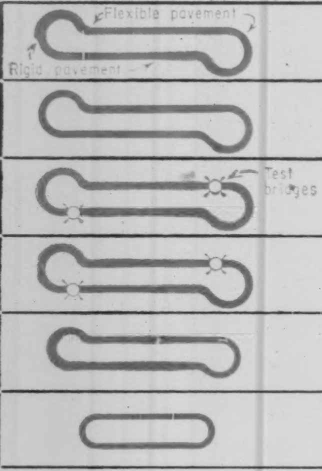


Table of Test Loads and Pavement Data:	Axle Loadings (lb)		Rigid Pavement			Flexible Pavement			
	Outside Lane	Inside Lane	Number of test sections	Concrete Slab (in.)	Subbase (in.)	Number of test sections	Asphaltic Concrete (in.)	Base course (in.)	Subbase (in)
A	24,000 (T)	12,000 (S)	68	3½, 5, 6½, 8	0, 3, 6, 9	84	2,3,4	0,3,6	0,4,8
B	32,000 (T)	18,000 (S)	68	5, 6½, 8, 9½	0, 3, 6, 9	84	3,4,5	0,3,6	4,8,12
C	40,000 (T)	22,400 (S)	68	6½, 8 9½, 11	0, 3 6, 9	84	3,4,5	3,6,9	4,8,12
D	48,000 (T)	30,000 (S)	68	8, 9½ 11, 12½	0, 3 6, 9	84	4,5,6	3,6,9	8,12,16
E	2,000 (S)	6,000 (S)	40	2½, 3½, 5	0,3,6	68	0*, 1, 2, 3	0,3,6	0,4
F	No Traffic	No Traffic	56	2½, 5, 9½, 12½	0,6	64	1,3,5	0,6	0,8,16

(T) = Tandem axle (S) = Single axle * = Surface treatment

be made at preselected intervals of 25 or 100 ft.

The longitudinal profilometer will, in effect, plot a true profile of the roadway in each wheel path as it moves at 10 mph. The transverse profilometer will automatically determine the depth of rutting in flexible pavements, or if desired, plot a true transverse profile.

Data from most of these devices will be translated into the desired units directly in the field equipment, digitized and punched into paper tape. The tape then can be fed directly to a digital computer or a tape-to-card punch machine in the data processing center. A Bendix general-purpose digital computer and several types of IBM equipment will be maintained in the project administration building. Some of the more cumbersome analyses of data will be done in a larger digital computer at the Purdue University Statistical Center.

• Construction tolerances—Strict controls and rigid tolerances are required in construction. The roadway embankments were constructed to insure uniform support for the test pavements. Fine-grained clay soil was brought in from nearby borrow pits by large earthmovers, dumped in place and bladed into 6 in. loose lifts.

Several rotary speed mixers pulverized the A-6 soil (a plastic clay soil, according to Bureau of Public Roads classification) and added sufficient water to bring it to the required moisture content. The material then was compacted by 15 ton pneumatic-tired compactors. Each 4 in. lift was required to be compacted to a density between 95% and 100% of standard maximum, with a moisture content between plus-or-minus 2% of optimum.

The quality control of embankment construction required about 50,000 density and moisture-content tests during the fall of 1956 and spring of 1957. In one 13 hour day, the laboratory completed 1,200 tests.

No heavy equipment is permitted on the central 24 ft of completed sections of roadway embankment in the test areas. This forces the contractors to operate loaded trucks on the shoulders in handling granular subbase and base course materials as well as all the materials used for the rigid and flexible pavements.

• Construction procedure—The roadway embankment was trimmed after completion to a grade tolerance of plus-or-minus ⅛ in. by subgraders operating on road forms. Granular subbase material was delivered by truck and mixed in a concrete paver. Then it was dumped into a conveyor-loader that carried it across the subgrade to a tractor-spreader that was operating on the material being spread.

Quality control of the sand-gravel subbase material required it to be washed and screened and the proper amount of fines added as it was run through a batching plant. It then was delivered to the paver at the site, in batch trucks. The grading contractor placed the first layer of subbase last year, as part of his contract.

• Rigid pavement—A batching plant for the portland cement concrete pavement is located midway of the job. Stockpiled aggregates are elevated by conveyor into a 150 ton, 4 compartment bin, and batched into trucks. During cold weather, the plant's open scale platform was enclosed with a vinyl plastic to protect the operator and still provide ample daylight.

Paving equipment includes two complete spreads—dual-drum 34E paver, spreader, finishing machine and longitudinal float—for the 24 ft pavement on tangents, and one for paving each 14 ft lane of the super-elevated turnarounds.

Specifications call for the concrete to have minimum strengths of 550 psi flectural and 3,500 psi compressive at 14 days, using 6 bags of cement per cu yd of concrete and a slump of 1½ to 2½ in. The concrete also is required to have 4.5% entrained air, with a tolerance of plus-or-minus 1½%. Transverse contraction joints and a longitudinal joint on center line of pavement are sawed ⅛ in. wide and to depths of ¾ in. to 2¼ in. Concrete is cured with wet burlap for 24 hours, then with wet straw for five days.

• Flexible pavement—All asphaltic concrete for the pavement is produced in two plants at the west end of the project. Surface course is made in a 120 tons per hour continuous plant and binder course material in a volumetric batch plant with a rated capacity of 160 tons per hour.

Normally, only one of the bituminous

plants is operated at one time. A 10 man crew runs the plants; about 25 are at the pavement site. And up to 20 trucks deliver the asphaltic concrete to the two, or possibly three bituminous finishing machines.

Getting the hot-mix material from trucks to finishing machines is a prolem since the trucks are not permitted on the 24 ft central width of embankment. Consequently, the hot-mix is transferred from the trucks, which operate on the shoulders, to the finishing machines by a Gradall with a modified ½ yd bucket to scoop the material out of the trucks.

Generally, two finishing machines operate as a staggered pair in laying the binder or surface courses in 12 ft width. The hot material is compacted first by a pair of 7 to 11 ton three-wheel steel rollers, then by 12 ton pneumatic tired rollers and finally by 8 to 12 ton tandem steel rollers.

• **Test bridges**—The 16 test bridge spans are grouped in sets of four, located in the tangents of the test loops C and D outside of the pavement test areas. Each is a 50 ft simple span, with a cast-in-place reinforced concrete roadway.

There are four prestressed concrete bridges, four reinforced concrete deck girder bridges, and eight steel I-beam bridges. Two of the steel I-beam bridges have shear connectors welded to the top flanges.

The two major objectives of the $470,000 bridge research program are to determine the structural behavior of the bridges under repeated overstressing, and the effects of impact from moving loads.

• **Who's who on the job**—W. B. McKendrick, Jr., is project director, and William N. Carey, Jr., is chief engineer for research. W. E. Chastian, Sr., engineer of physical research of the Illinois Division of Highways, is in charge of construction.

Other staff and research engineers in responsible charge include: Paul Irick, data processing and analysis; F. H. Scrivner, rigid pavement; A. C. Benkelman, flexible pavement; Ivan M. Viest, bridges; J. F. Shook, materials; Arthur Tosetti, roads; Howard Boswell, maintenance; R. C. Leathers, special assignments, and H. C. Huckins, instrumentation lab.

S. J. Groves & Sons Co., Minneapolis, holds a $5.7 million contract for the roadway paving and related work. J. F. Healey is serving as the project manager, Chet Farrell as general superintendent, and Ralph Hart as paving superintendent. The flexible pavement is being constructed by Rock Road Construction Co., of Chicago, under a subcontract. Louis E. Giannetti is the superintendent.

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The combination of alloy aluminum plate with steel in the bowl construction of material handling buckets . . . 2½ cubic yards and over, eliminates up to 1000 pounds of dead weight. This affords a like amount of increase in pay load when rehandling comparatively light, free-flowing materials.

The exclusive feature of the closing line lead in the center plane of the bucket eliminates sharp bends at the guide sheaves and rollers, thereby increasing the life of the closing cable from 75% to 100%.

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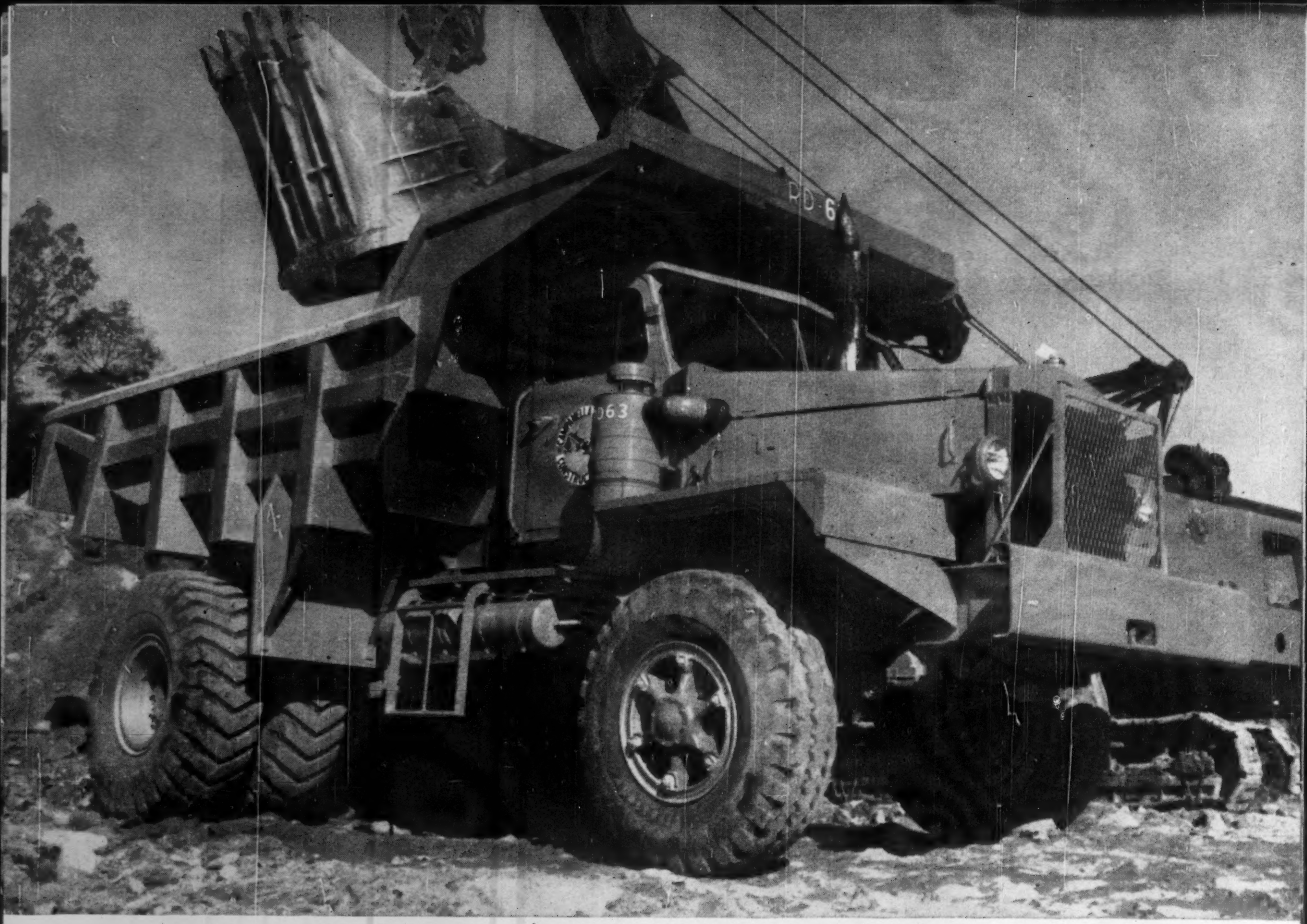

During construction of vital Interstate Highway section, Campanella and Cardi's 22½-ton Mack dumpers once again proved that they are built to get the tough jobs done, with little or no down time and only routine servicing.

Vital highway links

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Maneuverability and ease of handling pay off in the tight spots. On the Division Street project in Pawtucket, R. I., space was at a premium. Spotting, dumping, or traveling over busy city streets, the combination of Mack maneuverability, and the positive traction provided by Mack's exclusive Balanced Bogie with Power Divider, materially speeded up work cycles on this project.

"We finished off the Interstate Highway job in record time, thanks to our Macks." Campanella and Cardi set new records for a job of this type, which included relocating the channel of the Big River, excavating for bridge construction, and hauling in heavy materials.

rushed to completion

"As the trucks go . . . so goes the job." That's what Campanella and Cardi Construction Co. of Providence report. They credit their 55 Mack trucks with maintaining their reputation for record-time contract completion.

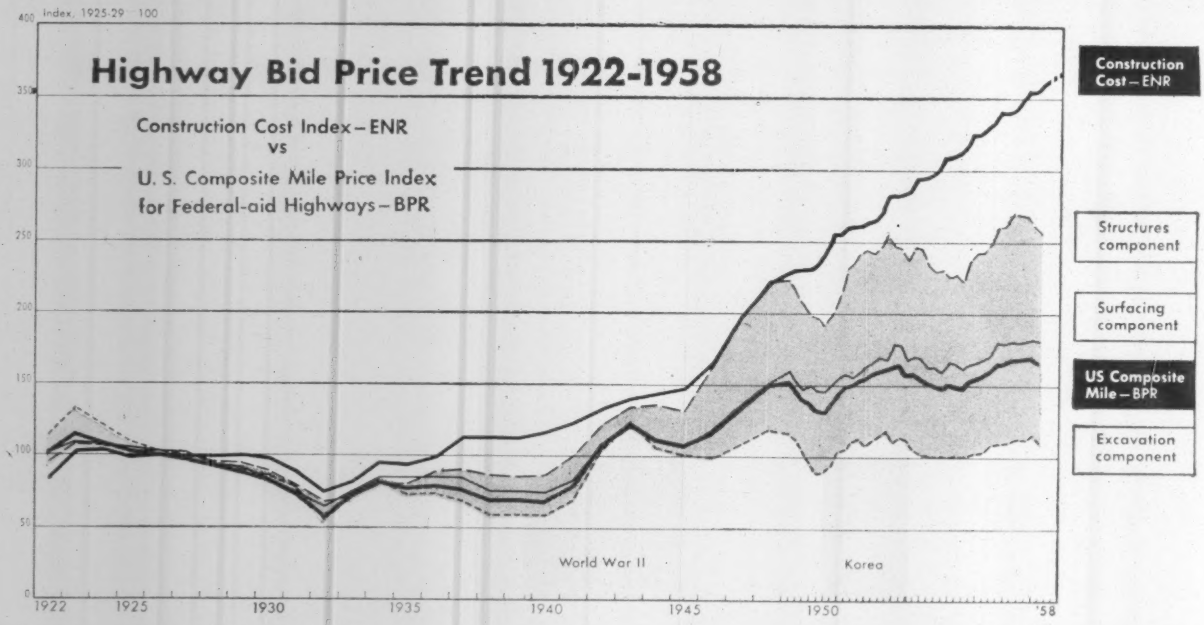
They'll tell you that with Macks pacing the job, the hauling-dumping cycle proceeds on-the-double . . . shovels operate at full capacity . . . down time is held to a minimum.

Husky Mack dumpers take the day-in, day-out beatings delivered by the tons of rock and earth dropped from the shovels . . . and keep coming back for more.

Campanella and Cardi will tell you that Mack dependability speeds their entire operation. So will the Mack user nearest you. Get his name from your Mack branch or distributor. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

MACK
first name for
TRUCKS

Second Quarterly Round up: **Highway Price Trends**



Lag In Road Awards Cut Prices

U.S. Composite Mile Highway Bid Price Index

U. S. Bureau of Public Roads, 1925-29 = 100

Year	Excavation[1] 17,491 cy* Bid price	Excavation[1] 17,491 cy* Sub-index	Surfacing[2] 3,726 sy* Bid price	Surfacing[2] 3,726 sy* Sub-index	Structures: Reinf. steel 16,000* lb. Bid price	Structures: Struct. steel 4,325* lb. Bid price	Structures: Struct. concr. 68* cy Bid price	Structures: Comb. Sub-index	Composite Mile Index	ENR 20-Cities Construction Cost Index
'25-'29 = 100	**$0.35†**	**100.0**	**$2.22†**	**100.0**	**$0.052†**	**$0.067†**	**$22.15†**	**100.0**	**100.0**	**100.0**
1926	0.38	103.7	2.20	103.1	0.053	0.074	22.76	103.7	103.4	100.5
1930	0.30	86.3	1.86	84.1	0.045	0.061	20.08	89.4	85.7	98.0
1932	0.18	55.0	1.44	64.8	0.034	0.046	15.33	68.0	61.0	75.6
1939	0.21	59.8	1.73	77.8	0.044	0.059	19.13	85.9	72.6	113.8
1940	0.21	59.2	1.68	75.6	0.045	0.063	19.17	87.6	71.6	116.9
1941	0.24	69.2	1.87	84.1	0.054	0.076	21.44	100.8	81.4	124.6
1942	0.37	104.1	2.39	107.9	0.065	0.090	26.16	122.3	108.8	133.5
1943	0.44	124.0	2.71	122.3	0.067	0.095	30.19	134.4	124.9	140.1
1944	0.37	106.6	2.45	110.6	0.064	0.089	31.94	136.5	113.1	144.4
1945	0.36	101.6	2.38	107.4	0.062	0.077	31.62	132.5	109.0	148.7
1948	0.35	99.1	2.65	119.3	0.075	0.113	38.79	164.7	119.0	167.2
1947	0.38	108.4	3.01	135.5	0.093	0.132	45.84	196.9	135.0	199.7
1948	0.42	119.3	3.37	151.0	0.108	0.158	51.00	223.9	151.2	222.6
1949	0.38	197.4	3.40	153.1	0.104	0.146	47.36	210.3	145.8	230.5
1950	0.33	94.5	3.32	149.8	0.100	0.139	44.62	199.4	137.7	246.3
1951	0.39	110.0	3.54	159.5	0.120	0.180	52.07	237.8	153.7	262.2
1952	0.40	114.2	3.80	171.3	0.124	0.186	54.50	247.8	162.5	275.1
1953	0.38	108.6	3.82	172.0	0.122	0.186	53.53	243.8	160.2	289.9
1954	0.35	100.9	3.63	163.6	0.116	0.167	50.91	229.9	151.2	303.4
1955	0.36	101.9	3.67	165.3	0.116	0.165	51.99	232.8	152.8	318.8
1956	0.38	108.2	3.89	175.5	0.131	0.202	54.33	253.8	163.3	334.6
1957:	**0.40**	**113.5**	**4.02**	**181.2**	**0.137**	**0.218**	**56.92**	**267.0**	**170.0**	**349.8**
Q1	0.39	111.7	4.01	180.8	0.141	0.215	57.46	270.6	169.7	342.4#
Q2	0.40	113.4	4.00	180.3	0.137	0.221	57.35	268.7	169.8	348.6#
Q3	0.40	112.5	4.02	181.3	0.135	0.225	57.48	268.3	169.9	356.5#
Q4	0.41	116.5	4.04	182.2	0.135	0.210	55.40	260.4	170.6	356.6#
1958:										
Q1	0.39	110.3	4.92	181.3	0.131	0.201	54.99	255.6	167.1	359.7#
Q2	.....	.....	....	.....	.....	.....	.....	.....	.....	365.9#

•[1] Common excav. plus other excav. Items expressed as equivalent common excav.
•[2] Portland-cmt. concr. plus other surfacing expressed as equivalent portland-cmt. concr.
•* Fixed quantities used for establishing price trend. •† Prices used for base year index.
•# Last month of quarter.

The highway price inflation bubble developed a slow leak late in '57 and began to collapse in the first quarter of '58.

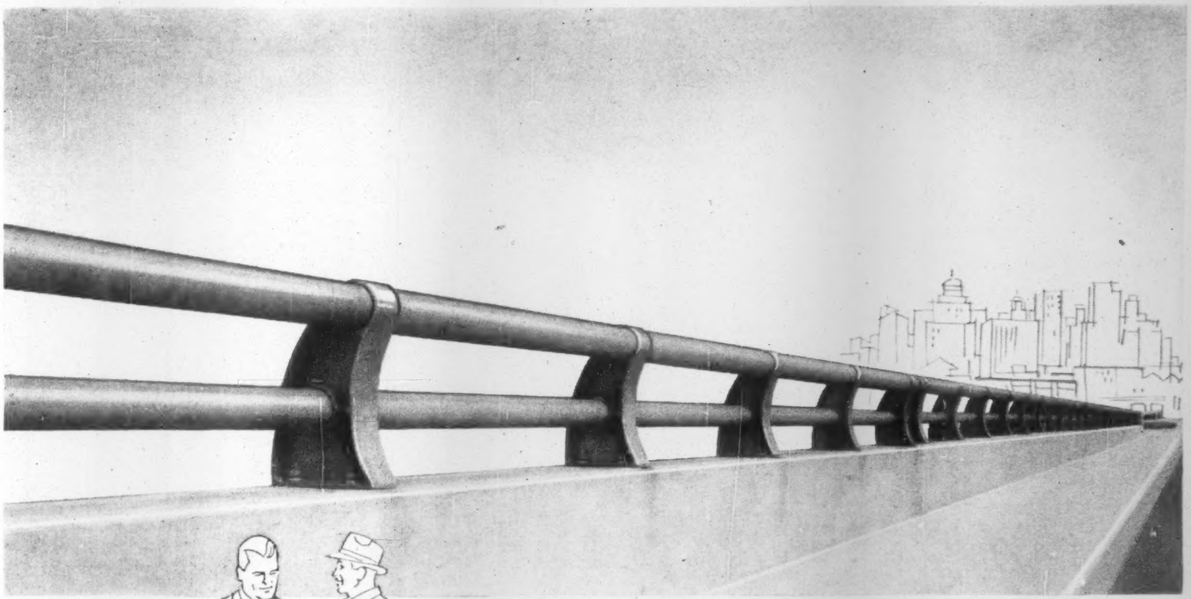
The reason: a temporary lull in new highway contracts. Contractors lopped off most of the two-year rise in bid prices which had been accelerated by the added pressure from the Interstate Highway Program.

This turnaround in the highway bid price trend was accentuated by the fact that the slowdown in highway contracts occurred at the same time a prolonged recession in awards for other types of heavy construction was touching bottom.

Contractors' bids on some state highway jobs broke downward in the fourth quarter of '57. The trend spread with the first quarter bringing clear cut agreement among all but a couple of the available bid price indexes: prices were below recent peaks—well below in some states.

The US Composite Mile Bid Price Index for federal aid highways dropped 2.1% in the first quarter, according to the US Bureau of Public Roads. This was the first decline in the BPR index since 1955's second quarter (chart above). It occurred despite a continuing rise in costs of basic construction materials and labor as measured by the ENR Construction Cost Index (chart).

(Continued on page 60)



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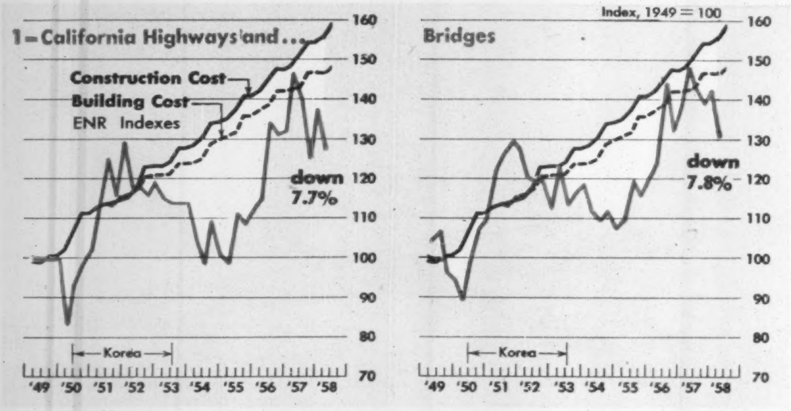
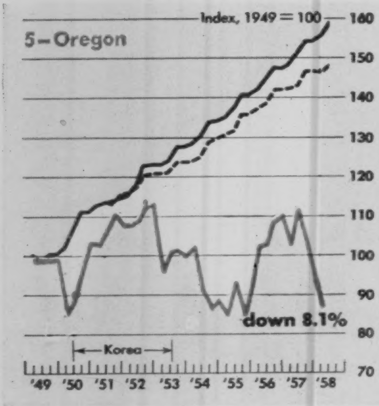
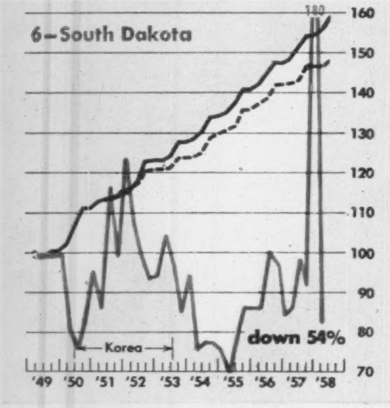
Second Quarterly Round up:

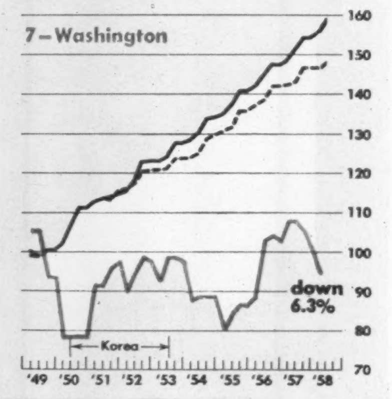
State Highway Price Indexes

Contractors trimmed bids on highway jobs let by 7 states in the first quarter . . .









The tipoff that a change in the highway bid price trend was brewing came during 1957 when the BPR Composite Mile Index practically stood still during the last nine months. Moreover, the fourth quarter showed a softening in two major bid items covered by this index: structural steel and structural concrete prices. Fourth quarter bid price indexes also turned lower in a few western states.

During the first quarter of this year, all of the bid items measured by the BPR index dropped. Structural steel and structural concrete continued declines started in the fourth quarter. They were joined in the descent by excavation, concrete pavement and reinforcing steel prices (see table on previous page).

Clear evidence of the downturn in highway prices came from state highway departments. Of the nine states that compute bid price indexes each quarter, seven reported prices dropping in the first three months of '58 and only two reported a rise (see charts above). Two of three states with semi-annual indexes—Connecticut and Minnesota—called a turndown in the second half of '57, while Michigan stood alone with a rise (see charts on page 62). Minnesota also reported the first quarter bid prices averaging lower than in the second half of '57.

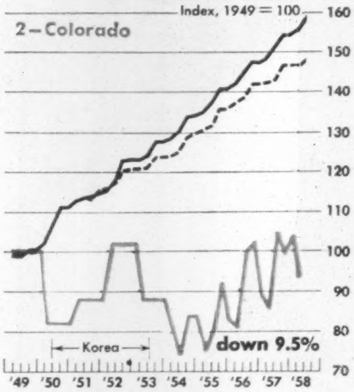
Most of the annual indexes showed that 1957 average bid prices were below 1956. Of the ten states that compute indexes once a year, six showed a drop in '57 prices compared with '56. In the other four states, the trend was up (charts page 62).

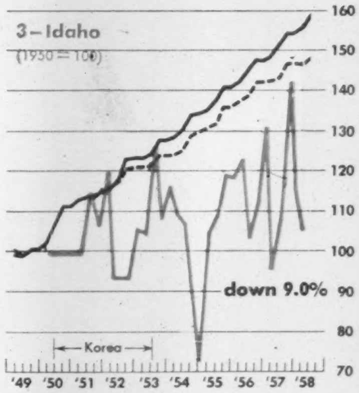
Competitive Squeeze—When the new Interstate Highway Program spawned a sharp spurt in highway and bridge construction contracts in late 1956, the construction industry was geared to handle double the volume of available work it was accustomed to. Contractors' purchases of new excavating, earthmoving and paving machines soared and remained high through the first four months of '57.

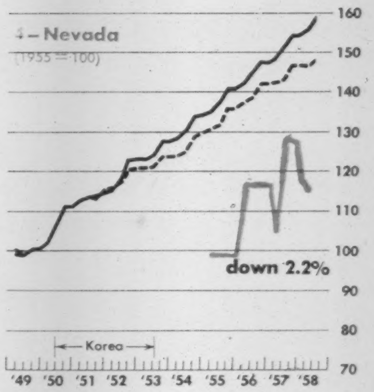
At first, there was lots of new highway work to go around. Prices moved up because of this and because of booming demands for materials and machines needed for other types of heavy construction. But then the stream of new contracts began to dry up—work other than highways was hit first (in late '56) and highway lettings fell almost a year later. As new business slowed, the competitive race for new jobs speeded up. More and more contractors showed up at bid calls and many trimmed bid prices to get new business. Without new work they risked being unable to hold their crews together. Moreover, simple laws of construction economics dictated that contractors had to keep their machinery fleets hauling pay dirt, not gathering dust.

It was not easy to trim bid prices in the face of increasing costs of labor, machinery, money and many key materials. But contractors found that some of the inflationary influences on their costs were abating. Some materials prices softened late in '57—lumber and plywood for forms, for example. Price premiums for steel disappeared. On other items, list prices held but contractors could shop for discounts that amounted to price reductions. Furthermore, subcontractors were also caught in a vice and they trimmed bids turned in to prime contractors. And structural steel fabricators slashed their prices during the last four of five months of '57 (ENR Jan. 2, 1958, page 72).

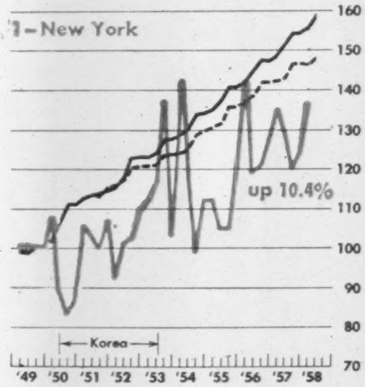
These price reductions were largely triggered by the slump in contract awards for construction other than highways, a slump which didn't bottom out until December '57.

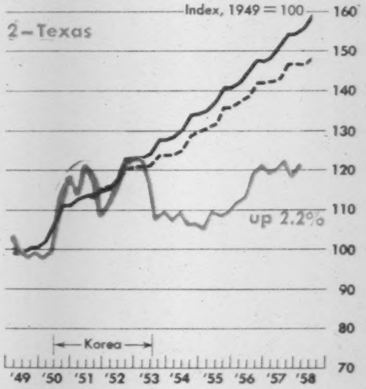






. . . but in these 2 states the trend was up . . .





The softening in many materials prices had another far-reaching effect. That was to dispel some of the belief that there was no end in sight for the 1955-early '57 price spiral. This change in the outlook was also influenced by readily available supplies of just about everything highway contractors needed to do the job—materials, manpower, machines and working capital. This situation meant the contractor had only one major cost escalator, labor rates, to consider and allow for during the life of the job he was bidding.

Situation Temporary?—Both of the main factors behind the recent drop in highway bid prices are now changing their colors. Construction contracts have rebounded from their December '57 low. Following a slight rise in January, the contract curve accelerated its rise, staging the sharpest upturn in history. May was the second largest month in ENR contract history.

A late starter in this '58 upturn was highway work, which didn't get into the upswing until April. But now highway contractors are signing up new business at a record clip.

These two developments almost surely will work toward halting the downtrend in highway bid prices during the current quarter. Confirmation of this will have to wait until July when second quarter bid price indexes are reported to ENR by state highway departments and the US Bureau of Public Roads.

It's another thing, however, to expect bid prices to swing completely around and head upward in the near future. While 1958 wage increases for construction trades and equipment operators are running close to the highest on record, highway bid prices are somewhat insulated from the effects of increased wages—over the short run. Highway contractors are mechanized to such an extent that operators' wage hikes in a year produce only a ripple in the over-all cost structure.

In addition, materials and machinery price stability should hold for most of '58. This is because productive capacity of the highway contractors' suppliers is much larger than the current rate of demand. And no shortages are in sight that would step up pressure for price increases.

States Cite More Bidders—The California Division of Highways reports that a 7.7% drop in its first quarter highway bid price index was probably due to sharper competition among contractors. This was caused by a reduction in the total number of state highway projects underway during the quarter. The number of bidders per project averaged 9.3 per letting in the first three months of '58, compared with an average of 8.8 bidders per project let in the fourth quarter and an average of 7.0 bidders in the first quarter of last year.

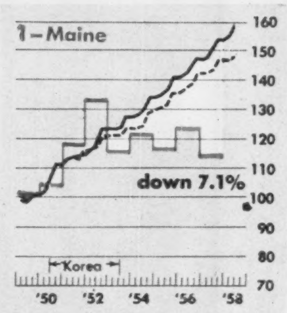
However, competition eased a bit in California towards the end of the first quarter. From a peak average of 11.6 bidders on January '58 lettings, the number of contractors declined to an average of 9.2 per job in February and 7.6 in March.

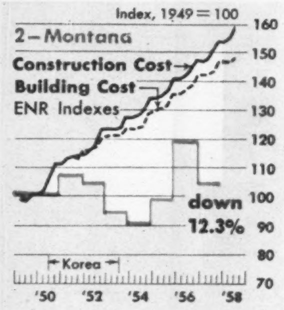
In Nevada, where the state highway bid price index declined for the third consecutive quarter, the highway department says the latest "decline reflects keener competition . . . an average of 8.8 contractors placed bids in the last quarter as against an average of only 7 a year ago." Rivalry was keenest for the larger Nevada jobs, on which bids were taken in the first quarter. The number of bidders averaged 12 on two contracts costing between $250,000 and $500,000 and 11 bidders on two projects costing over $1 million each.

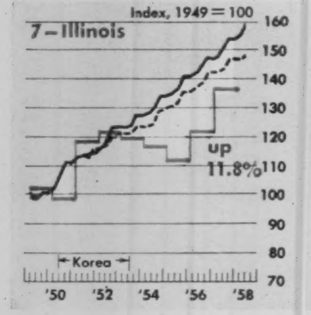
The consensus of contractors reinforces the view of state highway depart-

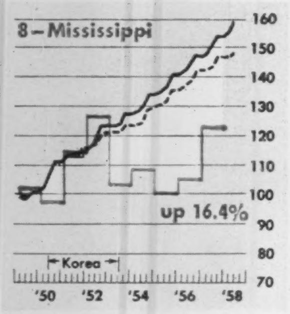
. . . 1957 annual bid price indexes for 10 states show the trend was down compared with 1956 in 6 states

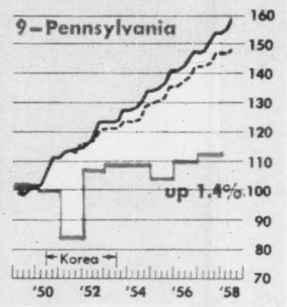
. . . while in 4 states the trend in '57 was up . . .

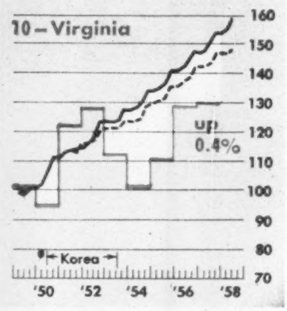












ments. Answers to a telegraphic survey of members by the Associated General Contractors reveal that 69%—or nearly seven out of ten responding—find competition today is greater than a year ago. Only 1% report competition less keen today than a year ago while 26% see competition unchanged from last year. This survey, released last week, also shows that 17% of the contractors believe the recession in business activity caused competition to increase and bid prices to decline below a year ago. While the recession in general business had no effect on the rate of new highway and bridge contracts, it cut into other types of construction and affected other contractors. But to the extent that some of these firms switched over or concentrated more on the highway market—as prime or subcontractors—the increasingly competitive highway bidding situation was aggravated.

Prices of Major Items Down—Average unit prices of items used to compute state highway bid price indexes show first quarter '58 declines in excavation, reinforcing steel, concrete and asphalt paving materials. While some of these items moved up in one or two of the eight states for which data is available, the pattern was down in the others.

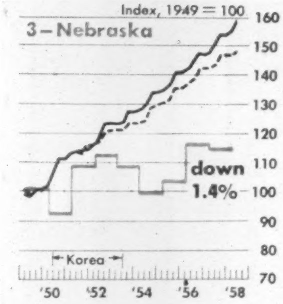
Excavation prices dropped in California, Colorado, Idaho, Nevada, Oregon, South Dakota and in the US Bureau of Public Roads indexes. Oregon reported the lowest average unit price for grading since the fourth quarter of '55. The BPR average price for common excavation in the first quarter was the lowest in a year. South Dakota's excavation average price rocketed in the previous quarter (October-December '57) because of distortion (only one job for a small quantity). For this reason, the 75% drop in the first quarter was exaggerated. However, the first quarter '58 price average was well below the second and third quarter averages in '57. Only one state reported a first quarter increase in excavation—New York.

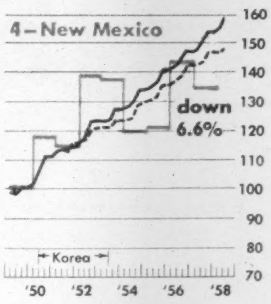
Concrete pavement prices skidded in the first quarter in California, Colorado,

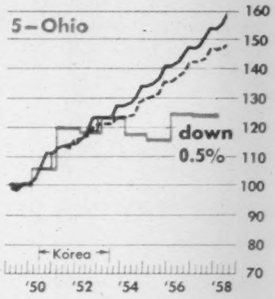
Highway Price Indexes

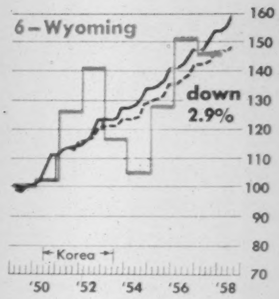
Reported to Engineering News-Record by State Highway

Region	U. S. COMPOSITE	NEW ENGLAND		MIDDLE ATLANTIC		SOUTH		MIDDLE WEST		
& State	Bur. Pub. Rds.	Conn.	Maine	N. Y.	Pa.	Miss.	Va.	Ill.	Mich.	Ohio
Base year:	1925-29	1939	'37-'40	1940	1940	'37-'41	'37-'41	'37-'41	1940	'37-'41
Year, quarter										
1940	71.6	93.9	...	100.0	100	100.4	95.8	91	100.0	94
1941	81.4	116.7	104	115.1	111	117.1	112.5	105	112.0	100
1942	108.8	141.1	136	149.1	138	158.8	149.1	135	138.0	125
1943	124.9	.....	150	169.4	157	173.7	172.4	132	152.0	138
1944	113.1	.....	...	.....	133	196.1	167.2	134	155.5	137
1945	109.0	151.5	...	152.2	167	234.9	176.9	137	154.3	144
1946	119.0	170.1	145	162.8	171	163.4	198.9	142	155.8	155
1947	135.0	186.4	173	191.4	201	187.9	205.1	153	151.5	175
1948	151.2	211.8	166	204.3	208	197.1	234.5	182	162.0	198
1949	145.8	184.6	148	202.8	193	182.7	203.6	162	149.0	170
1950	137.7	177.9	153	175.4	192	175.5	190.8	158	151.5	180
1951	153.7	218.4	173	208.7	216	206.5	247.1	189	173.0	204
1952	162.5	226.7	195	207.5	205	227.4	258.4	195	177.0	203
1953	160.2	219.0	170	245.8	209	186.8	226.2	192	178.8	211
1954	151.2	222.9	179	240.6	208	195.0	203.8	187	168.0	201
1955	**152.8**	.....	**171**	**214.8**	**199**	**180.7**	**223.4**	**179**	**181.9**	**197**
Q1	151.3	.....	...	227.1	...	.....	.....	...	.....	...
Q2	149.4	n.a.	...	213.7	...	.....	.....	...	.....	...
Q3	154.0	.....	...	212.8	...	.....	.....	...	.....	...
Q4	156.0	243.9	...	244.6	...	.....	.....	...	.....	...
1956	**163.3**	.....	**182**	**252.2**	**211.3**	**190.0**	**261.3**	**195**	**185.4**	**213**
Q1	157.5	.....	...	287.4	...	.....	.....	...	.....	...
Q2	161.1	271.0	...	241.8	...	.....	.....	...	H1 186.8	
Q3	167.2	.....	...	245.2	...	.....	.....	...	.....	...
Q4	167.4	288.1	...	259.9	...	.....	.....	...	H2 183.9	
1957	**170.0**	.....	**169**	**251.2**	**214**	**221.2**	**262.7**	**218**	.....	**212**
Q1	169.7	.....	...	273.4	...	.....	.....	...	.....	...
Q2	169.8	289.2	...	261.7	...	.....	.....	...	H1 171.6	...
Q3	169.9	.....	...	244.0	...	.....	.....	...	.....	...
Q4	170.6	263.4	...	251.1	...	.....	.....	...	H2 174.3	...
1958 Q1	167.1	.....	...	277.1	...	.....	.....	...	.....	...



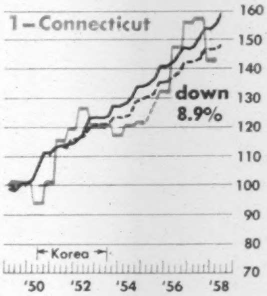


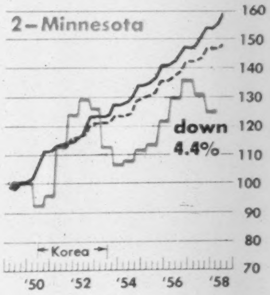


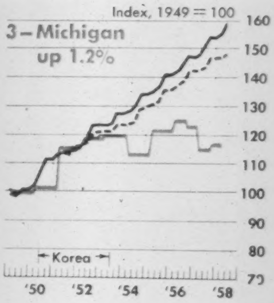


. . . semiannual indexes drop late in '57 in 2 states,

. . . rise in 1 state







New York and in the BPR U.S. average for federal aid projects. New York's average price for concrete pavement was the lowest since the second quarter of 1956. By contrast, prices jumped to a record high in Oregon.

First quarter structural concrete bid prices dropped in California, Colorado, New York and in the BPR Index. California's price was the lowest since the first quarter of '56. New York's price was the lowest since the third quarter of '56. BPR's average was the lowest since the second quarter of '56.

Class A concrete bids on Idaho jobs dropped to the lowest since early '56. In Nevada, Class AA concrete prices were below all quarters of 1957. However, structural concrete prices rose in Oregon (though the average was well below the high levels of 1956 and early '57) and South Dakota reported a rise in Class A concrete bid prices.

Bid prices for liquid asphalt, asphaltic concrete and plant mix were down in Idaho, Nevada and Oregon, but prices tended to rise in Colorado. Oregon's price for bituminous surfacing, while slightly above the fourth quarter of '57, was under preceding quarters.

Reinforcing steel prices dropped in the first quarter in Idaho, Nevada (lowest since first quarter '57), South Dakota (lowest since first quarter '55) and in the BPR index (lowest since first quarter 1956). California's price drop was attributed to one very large project that dominated the price average. New York reinforcing steel prices averaged the same as in the fourth quarter but were well under the 1957 high.

Structural steel bid prices moved lower as measured by the BPR average (lowest since second quarter of '56.) By contrast, increases came in the first quarter in New York, Colorado, California and South Dakota. However, unusual site location or small quantities accounted for increases in the latter two states.

For more details, see the tables on the following pages.

(For indexes used in estimating costs of other types of construction and for buildings, turn to page 94 and 96.)

in 23 States and the U.S.

Departments and The U. S. Bureau of Public Roads

Region	WEST OF THE MISSISSIPPI									FAR WEST					
& State	Colo.	Iowa	Minn.	Mont.	Neb.	New Mex.	S. Dak.	Texas	Wyo.	California		Idaho	Nev.	Ore.	Wash.
										Bridge	Hwy.				
Base year:	1949	1949†	1940	'40-'41	'37-'41	'38-'41	1940	'49-'53	1940	'39-'40	1940	1950‡	1955	1940	1940
Year, quarter															
1940	....	....	100.0	100.0	93.2	101.2	100.0		100	99	100.0	....	....	100.0	100.0
1941	....	....	101.5	100.0	103.3	113.0	107.9	....	126	122	125.0	....	....	115.9	126.7
1942	....	....	145.1	125.5	171.4	169.1	159.8	....	178	158	157.5	....	....	156.8	174.5
1943	....	....	130.2	125.5	152.7	193.8	197.9	....	166	165	156.4	....	....	158.0	181.2
1944	....	....	131.8	125.5	157.0	144.0	138.5	....	203	153	177.8	....	....	166.4	177.7
1945	....	....	132.2	121.7	181.0	187.4	202.7	....	201	167	179.5	....	....	145.5	163.9
1946	....	....	147.1	149.6	162.4	180.1	177.6	....	186	182	179.7	....	....	155.9	163.0
1947	....	....	169.0	167.5	188.6	186.6	212.2	....	197	215	203.3	....	....	185.1	194.6
1948	....	100.9	195.6	191.6	222.3	178.7	230.5	....	200	229	216.6	....	....	198.6	200.4
1949	100.0	100.0	160.0	180.7	207.1	179.2	217.0	89.8	167	201	190.7	....	....	181.1	214.5‡
1950	82.2	89.6	148.5	180.0	191.3	210.5	176.3	97.3	169	202	181.2	100.0	....	170.8‡	169.2‡
1951	87.7	104.1	185.3	192.4	223.7	206.1	229.4	104.0	209	248	225.0	110.2	....	194.7‡	202.8‡
1952	101.5	112.6	203.0	187.3	231.6	248.7	212.6	105.6	236	235	225.9	96.9	....	202.2‡	204.5‡
1953	87.7	106.1	175.8	169.0	223.8	246.9	197.1	102.7	196	229	215.2	114.2	....	182.0‡	208.3‡
1954	82.8	95.5	174.9	162.4	204.4	214.6	168.6	96.3	175	219	193.5	98.4	....	168.5‡	189.8‡
1955	**81.4**	**95.4**	**188.8**	**176.3**	**212.2**	**217.1**	**177.0**	**97.0**	**210**	**228**	**203.8**	**113.3**	**100.0**	**162.3**	**181.9**
Q1	76.4	....		157.3		....	154.9	94.7	..	217	189.3	104.6	....	156.1	173.0
Q2	81.4	....	H1 182.0	163.8*	....	....	172.8	99.0	...	237	212.4	110.1	....	170.0	181.4
Q3	92.3	....	....	170.7*	....	....	189.4	97.5	...	229	208.6	120.0	....	155.2	187.0
Q4	82.8	....	H2 194.6	176.3*	....	....	189.8	98.6	...	237	212.6	118.6	....	168.0	186.1
1956	**92.8**	**99.8**	**211.4**	**214.9**	**241.1**	**258.7**	**198.8**	**105.0**	**245**	**265**	247.3	**118.3**	**118.2**	**193.8**	**214.1**
Q1	80.5	....	....	229.2*	....	....	189.6	100.6	...	245	219.5	124.0	....	186.6	190.0
Q2	100.4	....	H1 207.8	215.8*	....	....	220.0	102.6	...	284	255.9	104.4	....	188.5	221.4
Q3	101.9	....	....	231.2*	....	....	212.0	107.4	...	260	249.1	113.0	....	198.6	223.7
Q4	88.5	....	H2 218.0	214.6*	....	....	184.8	109.2	...	273	252.1	131.8	....	201.4	....
1957	**97.3**	**102.6**	**204.7**	**188.5**	**237.7**	**241.5**	**205.6**	**108.2**	**238**	**238**	264.3	**116.1**	**124.3**	**187.9**	**226.4**
Q1	86.4	....	....	221.1*	....	....	189.0	107.4	...	292	277.7	95.9	105.5	187.7	231.4
Q2	105.4	....	H1 209.3	192.0*	....	....	213.7	108.3	...	283	266.9	109.0	130.4	202.0	232.2
Q3	100.0	....	....	189.3*	....	....	200.0	110.1	...	275	237.5	143.4	128.7	188.0	225.1
Q4	103.5	....	H2 200.0	188.5*	....	....	390.4	106.9	...	281	262.1	116.2	119.8	173.4	216.7
1958, Q1	93.7	....	198.4	....	....	....	179.6	109.2	...	260	241.8	105.8	117.2	159.3	203.0

† For fiscal year ending June 30; computed by ENR * Cumulative for year to date ‡ Annual average computed by ENR

Second Quarterly Round up: ▶ State Highway Prices & Indexes *Continued*

. . . in the Far West

California Average Highway Prices and Highway and Bridge Price Indexes

									Price Indexes	
Year	Rdwy excav $/cy	Crush run base $/t	Plant mix surf $/t	Asph conc pave $/t	PCC pave-ment $/cy	PCC struc-tures $/cy	Bar reinf steel $/lb	Struc-tural steel $/lb	Hwy const '40 = 100	Bridge const '39-'40 = 100
1940	$0.22	$1.54	$2.19	$2.97	$7.68	$18.33	$0.040	$0.083	100.0	99
1946	0.41	2.45	4.00	4.68	9.48	37.38	0.060	0.099	179.7	197†
1949	0.49	2.67	4.67	4.64	12.28	48.67	0.096	0.117	190.7	199†
'55 Q 1	0.39	1.69	4.55	....	13.44	40.66	0.095	0.140	189.3	217
2	0.42	1.99	5.39		14.46	51.36	0.098	0.136	212.4	237
3	0.41	2.33	5.43	5.70	13.46	49.64	0.093	0.132	208.6	229
4	0.37	2.00	5.52	4.00	15.05	52.72	0.099	0.144	212.6	237
'56 Q 1	0.40	2.08	5.40	6.50	14.05	52.51	0.105	0.166	219.5	245
2	0.51	2.06	6.27	....	14.64	57.13	0.113	0.219	255.9	284
3	0.52	2.27	6.12	....	15.57	56.32	0.121	0.178	249.1	260
4	0.52	2.21	**	5.93#	14.95	59.63	0.112	0.197	252.1	273
'57 Q 1	0.63	2.10	**	5.94	17.28	61.14	0.129	0.235	277.7	292
2	0.63	2.10	**	6.18	15.59	58.61	0.119	0.204	266.9	283
3	0.42	2.34	**	5.10	14.34	58.68	0.130	0.200	237.5	275
4	0.68	1.78	**	5.45	16.88	59.76	0.129	0.177	262.1	281
'58 Q 1	0.52	1.85	**	5.45	14.96	55.21	0.118	0.192	241.8	259

† average of quarterly values * untrdt rock base substituted for crusher run at this point ** Combined with asphaltic concrete pavement in 4th quarter '56 # Asphaltic & Bituminous Mixes beginning 4th quarter '56 •§ For items and weighted average 1939–40 prices see ENR Dec. 6, 1956, p. 115

Idaho Contract Unit Prices and Index

Year	Excav uncl $/cy	Sprink-ling $/Mgal	Roll-ing $/hr	Crush-surf $/t	Asph all gr $/gal	Plant Mix $/t	Conc. Cl A $/cy	Reinf. steel $/lb	Comp. index '50 = 100
'50	$0.618	$1.11	$4.06	$0.95	$0.129	$1.92	$54.17	$0.112	100.00
'55 Q 1	1.333	1.33	4.76	0.932	0.163	3.85	62.25	0.1413	104.6
Q 2	0.612	0.955	4.57	0.989	0.156	3.47	63.67	0.14	110.1
Q 3	0.601	1.19	5.92	0.886	0.159	4.07	58.97	0.1204	120.0
Q 4	0.55	1.26	5.69	1.45	0.168	2.47	55.97	0.126	118.6
'56 Q 1	0.85	1.32	6.18	1.08	0.20		60.54	0.123	124.9
Q 2	0.44	1.42	3.81	1.07	0.158	3.36	70.70	0.138	104.4
Q 3	0.477	0.88	5.33	1.164	0.183	*12.00	83.79	0.151	113.0
Q 4	0.684	1.25	7.53	1.478	0.156	4.16	74.21	0.153	131.8
'57 Q 1	0.403	1.43	1.44	1.265	0.183	3.83	77.88	0.1524	95.9
Q 2	0.496	1.45	5.80	1.43	0.189	2.995	82.00	0.153	109.0
Q 3	0.615	1.43	5.585	1.385	0.192	5.625	79.47	0.155	143.4
Q 4	0.678	1.17	4.43	0.94	0.188	3.58	69.56	0.175	116.2
'58 Q 1	0.482	1.49	7.12	0.931	0.179	2.99	67.43	0.155	105.8

*Not used in index because distorted by small quantity and unusual conditions

Nevada Average Unit Prices and Index

Year	Roadway excavation $/cy	Borrow $/cy	Type 1 Gravel $/cy	Type 2 Gravel $/cy	Liquid asphalts $/ton	Plantmix surface $/ton
1955	0.388	0.219	0.660	0.869	31.97	2.64
1956	0.506	0.300	0.845	0.893	39.86	2.48
1957 Aver	**0.562**	**0.291**	**0.751**	**0.920**	**39.63**	**2.96**
Q 1	0.374	0.211	0.685	0.833	38.30	2.70
Q 2	0.599	0.240	0.806	0.962	39.60	3.12
Q 3	0.603	0.340	0.792	0.979	40.45	2.88
Q 4	0.366	0.300	0.625	0.880	41.13	3.25
1958 Q 1	0.605	0.226	0.624	0.736	36.21	2.59

Year	Class AA concrete $/cy	Reinf steel $/lb	24" Corr. metal pipe $/lf	24" Reinf conc pipe $/lf	Composite Index 1955 = 100
1955	61.17	0.120	5.55	6.86	100.0
1956	78.98	0.144	6.08	7.00	118.2
1957 Aver	**71.63**	**0.147**	**6.72**	**6.88**	**124.3**
Q 1	80.72	0.132	6.82	6.47	105.5
Q 2	95.87	0.152	6.65	7.29	130.4
Q 3	65.75	0.153	6.69	7.29	128.7
Q 4	74.47	0.156	7.48	7.00	119.8
1958 Q 1	68.86	0.140	6.67	7.72	117.2

Oregon Composit and Sub-Indexes

Year	Grading	Cr rock surface	Bit mac surface	Asph conc pavement	Port cmt conc pave	Conc bridge & structs	Composite index
1940	100.0	100.0	100.0	100.0	100.0	100.0	100.0
'55 Q 1	146.0	123.4	176.3	102.6	240.8	269.1	156.1
Q 2	154.9	152.6	183.8	118.8	241.3	267.2	170.0
Q 3	162.7	118.1	151.5	102.4	241.1	285.3	155.2
Q 4	160.5	141.0	174.6	119.5	244.2	272.2	168.0
56 Q 1	170.8	187.9	176.2	112.6	250.0	291.9	186.6
Q 2	206.6	155.0	185.3	122.7	253.2	305.3	188.5
Q 3	217.7	179.1	189.1	123.3	259.5	303.4	198.6
Q 4	210.3	173.5	206.0	125.2	259.5	322.3	201.4
57 Q 1	217.7	145.4	188.4	119.9	259.5	304.5	187.7
Q 2	228.8	180.3	190.8	128.7	259.5	301.3	202.0
Q 3	233.9	153.8	180.8	118.1	259.5	278.7	188.0
Q 4	169.5	152.0	176.7	117.1	259.5	272.7	173.4
58 Q 1	166.1	125.3	178.6	110.2	279.7	286.9	159.3

. . . in the West of the Mississippi

Colorado Unit Prices Used in Contract Price Index

			Unit Price				
Item	Unit	Quantity	1949	1955	1956	1957	1st Q 1958
Excavation, unclass	cy	10,630	$0.441	$0.261	$0.337	$0.350	$0.327
Overhaul	stay	64,112	0.014	0.007	0.009	0.009	0.007
	ydmi	6,055	0.122	0.102	0.094	0.104	0.095
	tnmi	12,188	0.091	0.071	0.073	0.072	0.072
Sub-base	t	2,998*	0.521	0.343	0.364	0.471	0.480
Gravel, cr rock surf	t	1,976	0.894	0.766	0.893	0.991	0.885
Asphalt, liquid	gal	10,252	0.151	0.159	0.176	0.186	0.179
Asph surf, plant mix	t	279	4.500	3.163	3.130	3.144	3.022
Concrete pavement	sy	449	3.512	3.646	3.502	3.578	3.520
Concrete	cy	36	48.564	51.251	59.116	56.453	54.370
Steel, struct	lb	7,114	0.133	0.145	0.188	0.205	0.215
Culvert, CMP	lf	109#	5.823	6.955	8.724	8.423	9.133

* incl all matl whether bid as sub-base or select borrow # incl all diam prices at average of all pipe used

Kansas Highway Cost Indexes

						Bridges	
Year	Grading, culverts	Concrete pavement	Aggr. base course	Bit. constr types	Light type surfacing	Concrete	Steel
1940	100	100	100	100	100	100	100
1946	168	134	153	152*	129	212	142
1950	159	193	117	158	113	282	262
1955	199	242	169	205	153	348	320
1956	188	249	159	198	122	338	336
1957	196	241	167	169	144	372	368

Nebraska Contract Unit Price Index

Year (Weight)	Excava-tion (18%) $/cu. yd.	Culvert concrete (5%)* $/cu. yd.	24" Culvert pipe (2%) $/lin. ft.	Class "A" gravel surface (20%) $/cu.yd.	PCC pave-ment (15%) $/sq.yd.	Asphaltic oil (15%) $/gal.	Bridge concrete (9%) $/cu.yd.	Struc-tural steel (16%) $/lb.	Com-posite Index 1937-41 = 100
1937	0.157	15.80	2.01	1.09	1.93	.081	19.51	.055	106.2
1940	0.097	13.49	1.92	1.02	2.08	.077	17.64	.049	93.2
1946	0.184	35.95	2.78	1.80	2.60	.099	42.64	.094	162.4
1949	0.202	43.53	4.15	1.97	3.53	.142	54.03	.144	207.1
1955	0.168	45.95	4.68	2.08	3.59	.143	51.92	.166	212.2
1956	0.187	44.76	5.05	2.21	3.57	.155	58.06	.231	241.1
1957	0.191	43.17	5.19	2.31	3.44	0.163	52.34	0.219	237.7

South Dakota Unit Prices & Price Index

	Road-way excav. $/cy	Cr. grav. surf. $/t	Liq. asph. $/gal	Pit. mix bit. surf. $/t	Conc. Cl A $/cy	Reinf. steel $/lb	Struct. steel $/lb	Com-posite Index '40 = 100
1940	$0.120	$0.59	$0.078	$1.49	$19.11	$0.044	$0.050	100.0
1946	0.214	1.13	0.101	2.91	38.49	0.085	0.095	177.6
1949	0.197	1.40	0.159	3.83	54.01	0.125	0.135	217.0
1955 Aver	**0.179**	**1.01**	**0.129**	**2.48**	**49.09**	**0.122**	**0.163**	**177.0**
Q 1	0.162	0.80	0.120	2.01	49.33	0.109	0.146	154.9
2	0.176	0.95	0.129	2.52	47.79	0.119	0.169	172.8
3	0.187	1.13	0.136	2.72	49.79	0.126	0.162	189.4
4	0.175	1.44	0.127	2.79	48.00	0.130		189.8
1956 Aver	**0.208**	**1.16**	**0.124**	**3.27**	**52.79**	**0.136**	**0.176**	**198.8**
Q 1	0.187	1.07	0.134	3.03	53.12	0.133	0.165	189.6
2	0.261	1.05	0.111	3.40	56.62	0.134	0.607	220.0
3	0.212	1.44	0.141	3.12	50.27	0.136	0.185	212.0
4	0.175	1.04	0.094	3.85	58.38	0.143	0.183	184.8
1957 Aver	**0.222**	**1.02**	**0.152**	**3.04**	**49.99**	**0.131**	**0.182**	**205.6**
Q 1	0.171	0.95	0.167	2.72	51.87	0.131	0.174	189.0
2	0.253	1.02	0.160	3.01	49.21	0.139	0.194	213.7
3	0.208	1.26	0.110	3.71	47.22	0.124	0.172	200.0
4	0.740	2.50	0.200	9.00	54.63	0.128	0.181	390.4
'58 Q 1	0.188	*	0.086	3.30	55.03	0.117	0.475	179.6

Wyoming Average Unit Prices and Index

Weight Year	Excav common 39% $/cy	Grav base* 29% $/cy	Oil 9% c/gal	Conc Cl A 11% $/cy	Struct steel 6% $/lb	Timber treated piling 6% $/lf	Comp. Index 40 = 100
1940	$0.125	$0.670	$0.067	$18.15	$0.067	$1.25	100
1946	0.250	1.263	0.093	33.61	0.108	2.105	186
1949	0.199	0.780	0.124	48.00	0.145	2.512	167
1955	0.243	1.152†	0.096#	62.446	0.177	3.545	210
1956	0.293	1.404	0.120	65.014	0.251	3.182	245
1957	0.286	1.297	0.126	60.105	0.237	3.717	238

* Surfacing and haul † Crushed Gravel Base Course (1" Max), type most used # Asphaltic Material AC (85–100), type most used

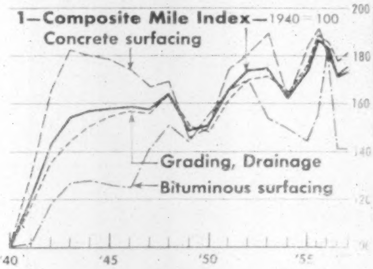
. . . in the Middle West

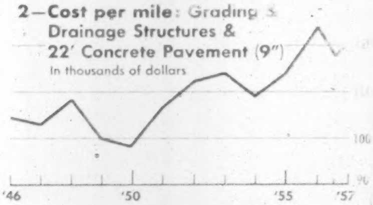
Illinois Price Index

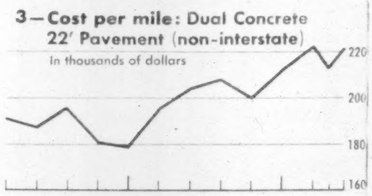
Year	Grading (14%)	Surfacing (58%)	Structures (28%)	Composite Index 1937-41 = 100
1919	186	117	124	129
1926	110	116	92	108
1929	103	106	87	100
1932	63	75	57	68
1933	75	87	69	80
1939	108	104	92	101
1940	93	91	89	91
1946	193	122	159	142
1949	141	139	219	162
1955	148	143	268	179
1956	163	145	313	195
1957	207	155	353	218

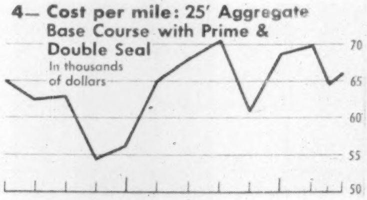
For complete record 1919-56, see ENR October 17, 1957, page 107

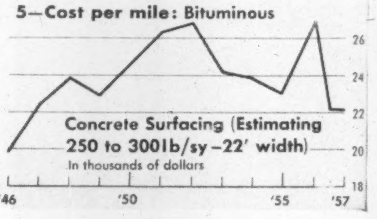
Michigan Highway Costs

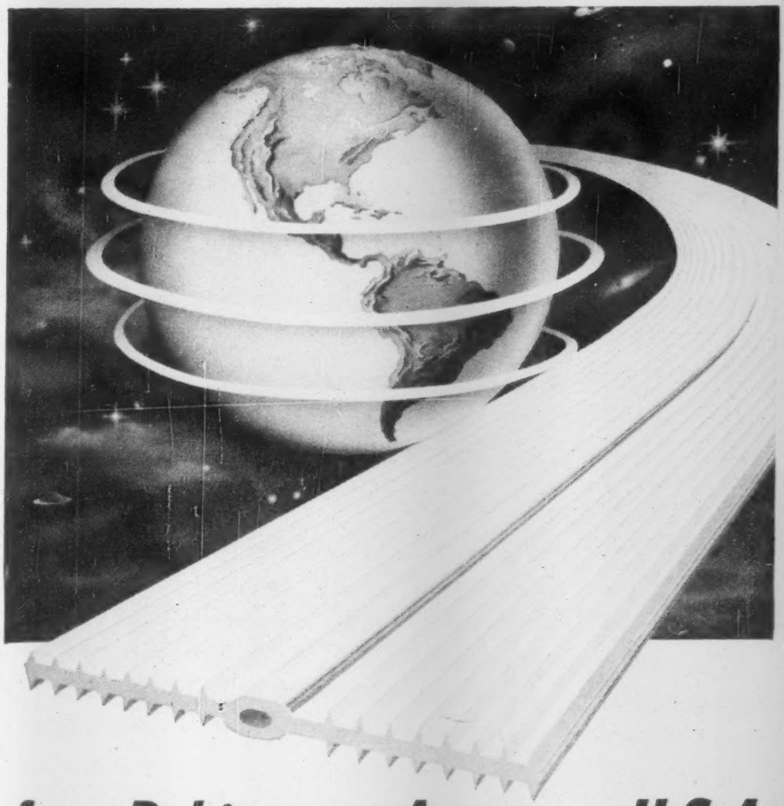

1—Composite Mile Index—1940 = 100


2—Cost per mile: Grading & Drainage Structures & 22′ Concrete Pavement (9″)
In thousands of dollars


3—Cost per mile: Dual Concrete 22′ Pavement (non-interstate)
In thousands of dollars


4—Cost per mile: 25′ Aggregate Base Course with Prime & Double Seal
In thousands of dollars


5—Cost per mile: Bituminous
Concrete Surfacing (Estimating 250 to 300lb/sy—22′ width)
In thousands of dollars



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"DURAJOINT" Waterstops have been chosen by Engineers and Architects around the world as the ideal waterstop for the elimination of water leaks through the expansion or construction joints of concrete structures. Test after test, conducted by various independent testing laboratories and on the job, conclusively prove that it takes the right combination of PVC material and multiple-ridge cross-section design, found only in DURAJOINT, to stop water under all joint conditions that are likely to exist. DURAJOINT Waterstops are strong, flexible, easy to install and may be spliced on the job without special equipment or skilled labor.

Send coupon today for complete technical information and data.

DURAJOINT TECHNICAL INFORMATION *Center*
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Gentlemen: Dept. 16

Please send, without obligation

☐ TECHNICAL REPORTS
☐ CATALOG No. 457
☐ Have representative call

NAME____________________
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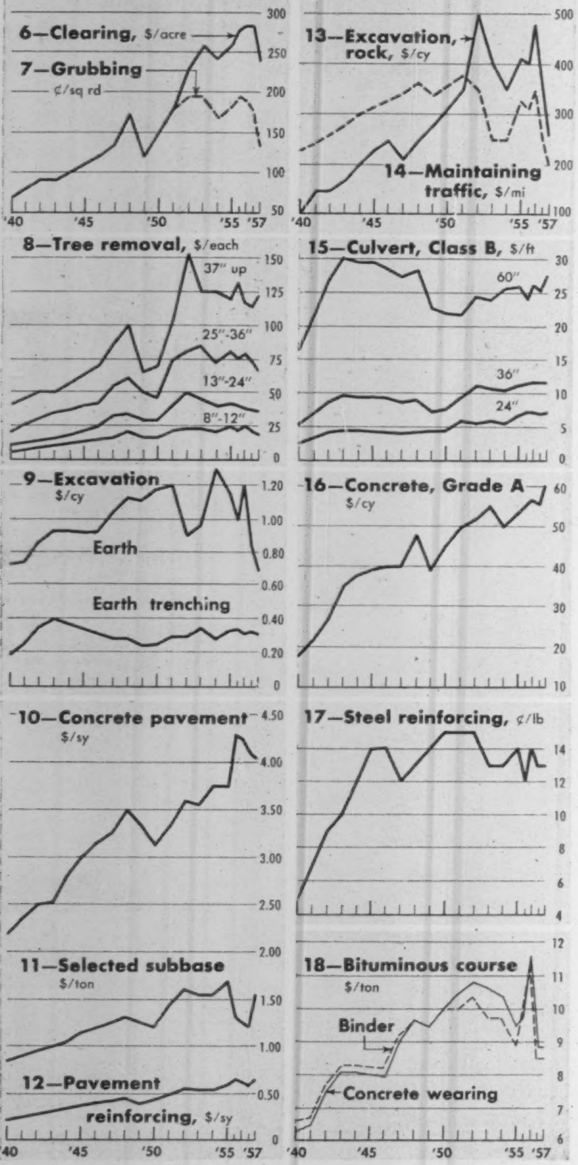
CITY__________ STATE__________

Second Quarterly Round up: ▶ **State Highway Prices & Indexes**

. . . Middle West continued

Michigan Highway Costs Continued



. . . in New England and Middle Atlantic

Connecticut Contract Price Indexes

Date	Structures	Grading drainage	Trunk line	Concrete pavement	Town aid	Composite
1939	100.00	100.00	100.00	100.00	100.00	100.00
1940	93.76	94.19	92.78	98.54	86.41	93.93
1945	138.65	175.09	160.97	138.04	168.62	151.47
1949	196.49	184.51	171.42	190.96	163.09	184.64
Dec '55	255.72	244.01	207.82	234.50	222.82	243.87
Jun '56	289.62	294.43	239.53	267.90	265.94	270.98
Dec '56	323.74	317.54	245.31	270.01	276.53	288.06
Jun '57	327.46	319.46	245.88	272.87	263.64	289.19
Dec '57	270.97	293.55	243.48	261.15	253.97	263.43

New York "Composite Mile" Costs

Year	Exc. uncl	Portland cement	Structural concrete	Steel bar reinf.	Structural steel	Cement concrete pavement	Total cost of composite	Index 1940=100
1940	....	....	.....	.....	.....	.....	$16,116	100.0
1946	$0.60	$2.71	$33.30	$0.074	$0.116	$8.29	26,230	162.8
1949	.69	3.56	41.71	.125	.145	11.25	32,688	202.8
1955:	.55	4.43	47.95	.14	.16	13.05	34,610	214.8
Q1	.57	4.32	45.09	.13	.11	15.61	36,609	227.1
Q2	.55	4.50	49.04	.13	.15	12.90	34,444	213.7
Q3	.54	4.29	47.61	.13	.15	12.69	34,303	212.8
Q4	.58	4.64	47.08	.15	.20	17.02	39,420	244.6
1956:	.83	4.52	51.65	.15	.21	13.46	40,652	252.2
Q1	.98	4.58	52.73	.16	.20	16.43	46,323	287.4
Q2	.78	4.40	52.34	.15	.21	12.73	38,965	241.8
Q3	.78	4.77	43.09	.14	.20	13.62	39,516	245.2
Q4	.83	4.58	53.38	.16	.22	14.34	41,883	259.9
1957:	....	....	.....	......	......	.....	.....	251.1
Q1	.91	4.98	57.24	.15	.18	14.62	44,072	273.4
Q2	.82	4.35	68.13	.13	.20	14.75	42,182	261.7
Q3	.75	4.81	56.25	.17	.24	14.74	39,331	244.0
Q4	.76	5.14	59.30	.15	.15	13.30	40,469	251.1
1958:	....	....	.....	......	......	.....	......	.....
Q1	1.03	5.09	52.67	.15	.18	13.16	44,665	277.1

Pennsylvania Average Unit Prices & Index

Year	Excavation Cl 1 $/cy	Excavation Cl 2 $/cy	CR aggr base 8" $/sy	Bit surf DP-1 $/sy	RCC pvmt 9" $/sy	Concrete Cl A $/cy	Concrete Cl B $/cy	Reinf steel bars $/lb	Annual Index '40=100
'40 H1	$0.419	$1.779	$0.799	$0.734	$2.586	$22.151	$18.059	$0.044	...
H2	0.417	1.680	0.808	0.695	2.515	22.522	17.601	0.045	100
'46 H1	0.833	3.308	1.667	1.007	3.796	48.785	41.397	0.079	...
H2	0.948	3.844	1.752	1.284	3.995	44.397	37.776	0.074	171
'49 H1	0.965	4.042	1.986	1.241	4.985	75.156	45.747	0.113	...
H2	0.834	3.823	1.771	1.199	4.744	54.13	40.820	0.108	193
'55 H1	0.604	2.664	1.764	0.950	5.333	48.868	43.488	0.114	...
H2	0.722	4.409	.....	1.016	5.254	56.127	44.305	0.118	199
'56 H1	0.904	4.243	1.861	1.500	5.715	53.208	41.998	0.122	...
H2	0.705	2.960	2.053	1.223	5.604	59,870	43.177	0.138	211
'57 H1	0.856	3.632	1.836	1.153	5.755	58.320	42.588	0.128	...
H2	0.676	3.079	1.793	1.153	5.901	60.634	42.843	0.130	214

. . . and in the South

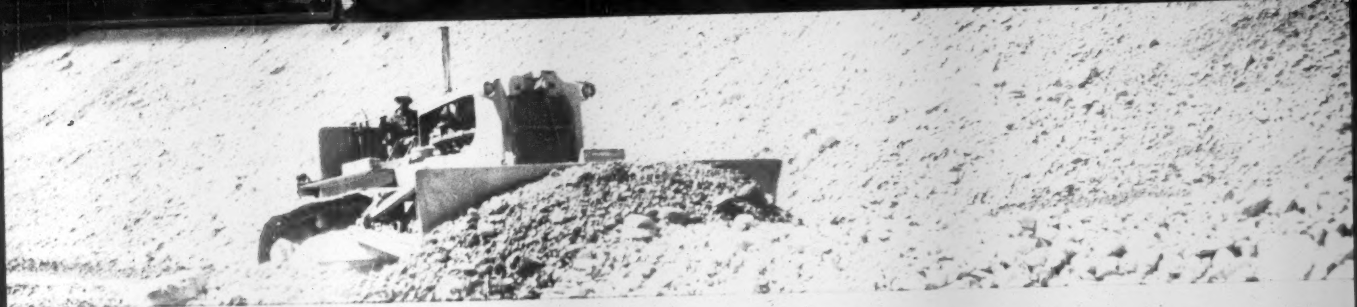
Virginia Unit Prices and Indexes

Year	Excavation $/cy	Excavation Sub-Index	Surfacing $/sy	Surfacing Sub-Index	Reinf. Steel $/lb	Structures Struct. Conc. $/cy	Structures Sub-Index	Composite Mile Index
1937-41	$0.282	100.0	$1.012	100.0	$0.0494	$22.13	100.0	100.0
1946	0.53	187.9	2.05	202.6	0.0790	49.36	203.6	198.9
1949	0.55	195.0	2.01	198.6	0.1040	50.92	225.9	203.6
1955	0.60	212.8	2.14	211.5	0.1229	58.56	261.2	223.4
1956	0.79	280.1	2.16	213.4	0.1500	70.59	315.7	261.3
1957	0.70	248.2	2.42	239.1	0.1513	73.63	327.1	262.7

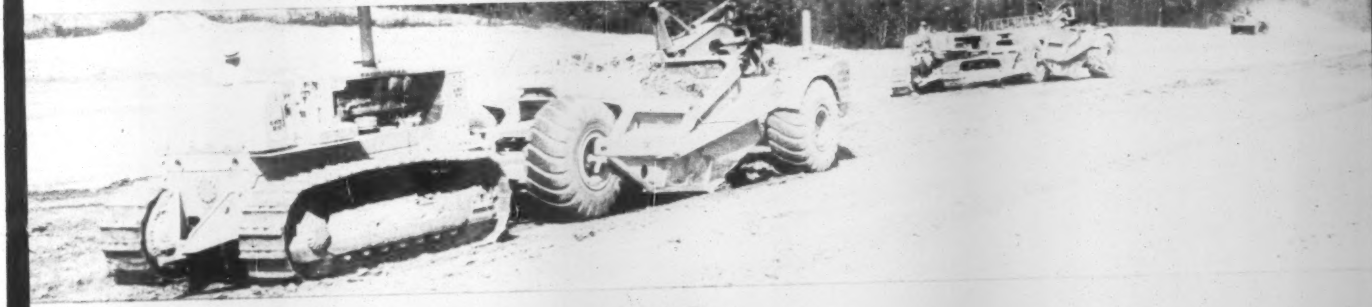
Mississippi Average Unit Prices and Index—1937-'41=100

Year	Grading Exc. uncl [a] $/cy	Grading Topping • $/cy	Drainage B conc culv [b] $/cy	Cement concrete pavement Plain cmt $/sy	Cement concrete pavement 7-5-7" RCC $/sy	Cement concrete pavement 8-6-8" RCC $/sy	Cement concrete pavement 9-6-9" RCC $/sy	Bit pavement Asph. prime $/gal	Bit pavement Cover mtls $/cy	Gravel Surf course $/cy	Gravel Stab aggr $/cy	Structures Conc, B&C bri $/cy	Structures Reinf stl. bri $/lb	Structures Str stl $/lb	Structures Timber treated $/Mbm	Structures Piling timb [f] $/lf	Structures Piling stl $/lf	Composite Index
1940	0.212	0.42	20.48	1.34	1.51	1.76	1.68	0.094	4.55	2.18	1.56	28.36	0.04	0.05	124.88	1.04	....	100.36
1946	0.311	0.62	42.46	2.72	2.28	2.38	2.49	0.11	5.25	2.85	4.25	41.22	0.07	0.085	211.11	2.34	3.21	163.42
1949	0.312	0.71	45.852	3.64	2.99	3.269	3.291	0.155	7.076	2.337	2.218	46.534	0.102	0.114	232.91	2.133	2.735	182.69
1955*	0.276	0.76	45.14	....	2.13 [de]	2.50 [de]	2.42 [de]	0.157	6.43	2.90	3.19	47.25	0.115	0.12	255.75	2.02	3.66	180.67
1956	0.271	0.78	44.49	....	2.54	2.99	2.89	0.156	6.43	2.68	3.17	53.61	0.123	0.17	278.28	2.03	4.29	189.96
1957	0.316	0.90	48.61	....	2.45	2.88	2.79	0.159	6.88	3.11	3.36	63.08	0.134	0.19	313.97	2.20	4.33	221.16
Base prices	34.8%		8.2%	20.2%				9.6%		4.1%		23.1%						
37-41	0.235	0.346	20.53	1.64	1.48	none	1.60	0.094	4.56	1.98	1.67	23.04	0.043	0.052	121.27	1.19	1.80	100.00
Sub wgt %	64.1	35.9	8.2	0.3	34.8	1.6	63.3	50.3	49.7	32.1	67.9	44.9	12.4	27.1	1.5	6.6	7.5	

* First half of 1955. [a] incl haul [b] incl D conc [c] first half of yr only [d] convrtd from 8" uniform [e] convrtd from 8" uniform [f] creo



How Caterpillar



showed the nation

hundreds of road building jobs

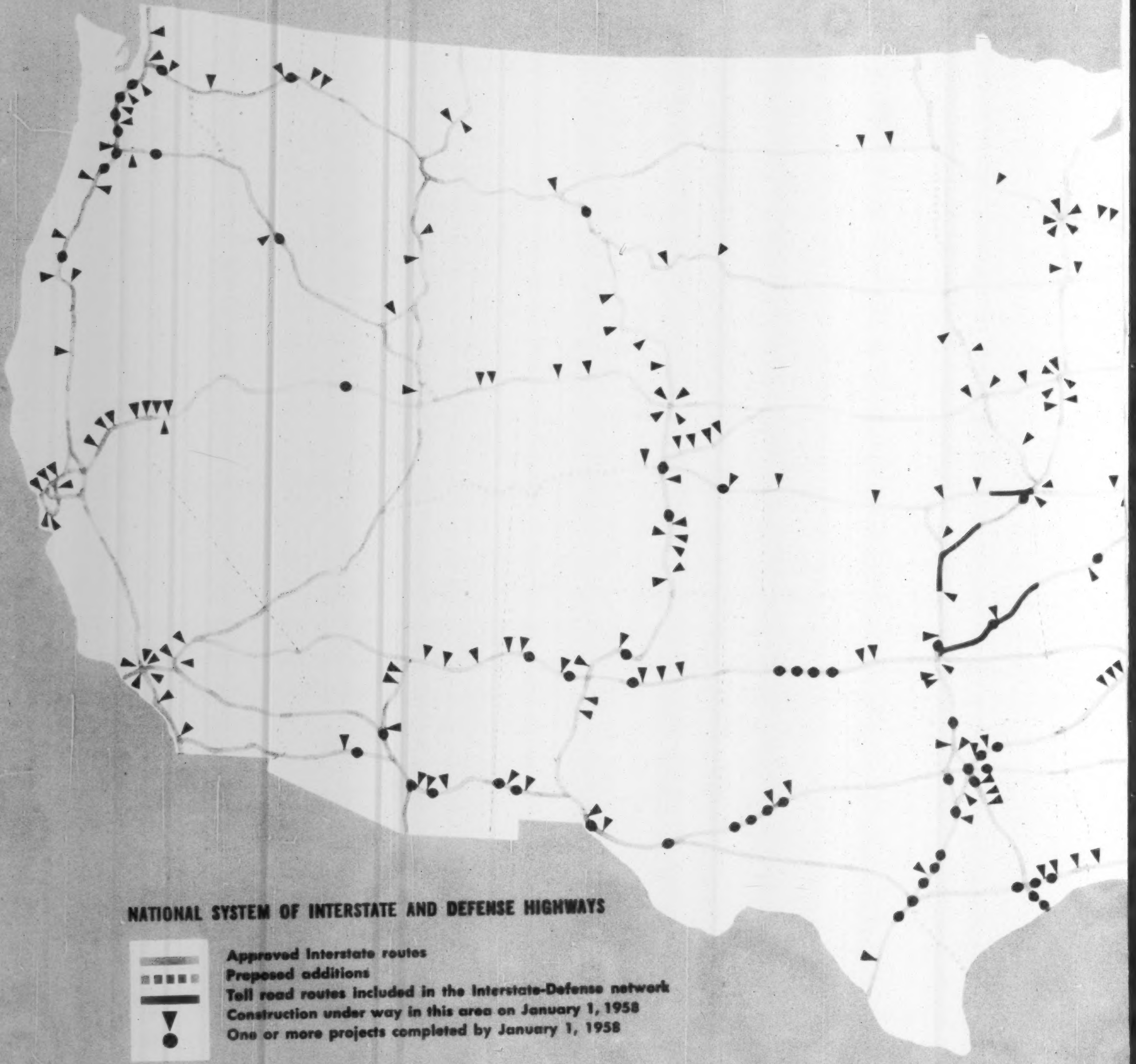
in a single advertisement

Never before have the taxpayers received such a complete report of progress on a public works project. It's part of Caterpillar's nation-wide information program designed to spotlight your work.

INTERSTATE 55

Caterpillar reports on the
greatest construction job in history

A GOOD START A



NATIONAL SYSTEM OF INTERSTATE AND DEFENSE HIGHWAYS

- ▬ Approved Interstate routes
- ▪▪▪▪ Proposed additions
- ▬ Toll road routes included in the Interstate-Defense network
- ▼ Construction under way in this area on January 1, 1958
- ● One or more projects completed by January 1, 1958

Giving the public the complete story on the highway program

The public never saw a map like the one reproduced in this recent Caterpillar advertisement. Chances are, you haven't either. But it made a point: just 18 months after the National System of Interstate and Defense Highways was approved by Congress, work was under way at hundreds of sites—but there is a long way to go.

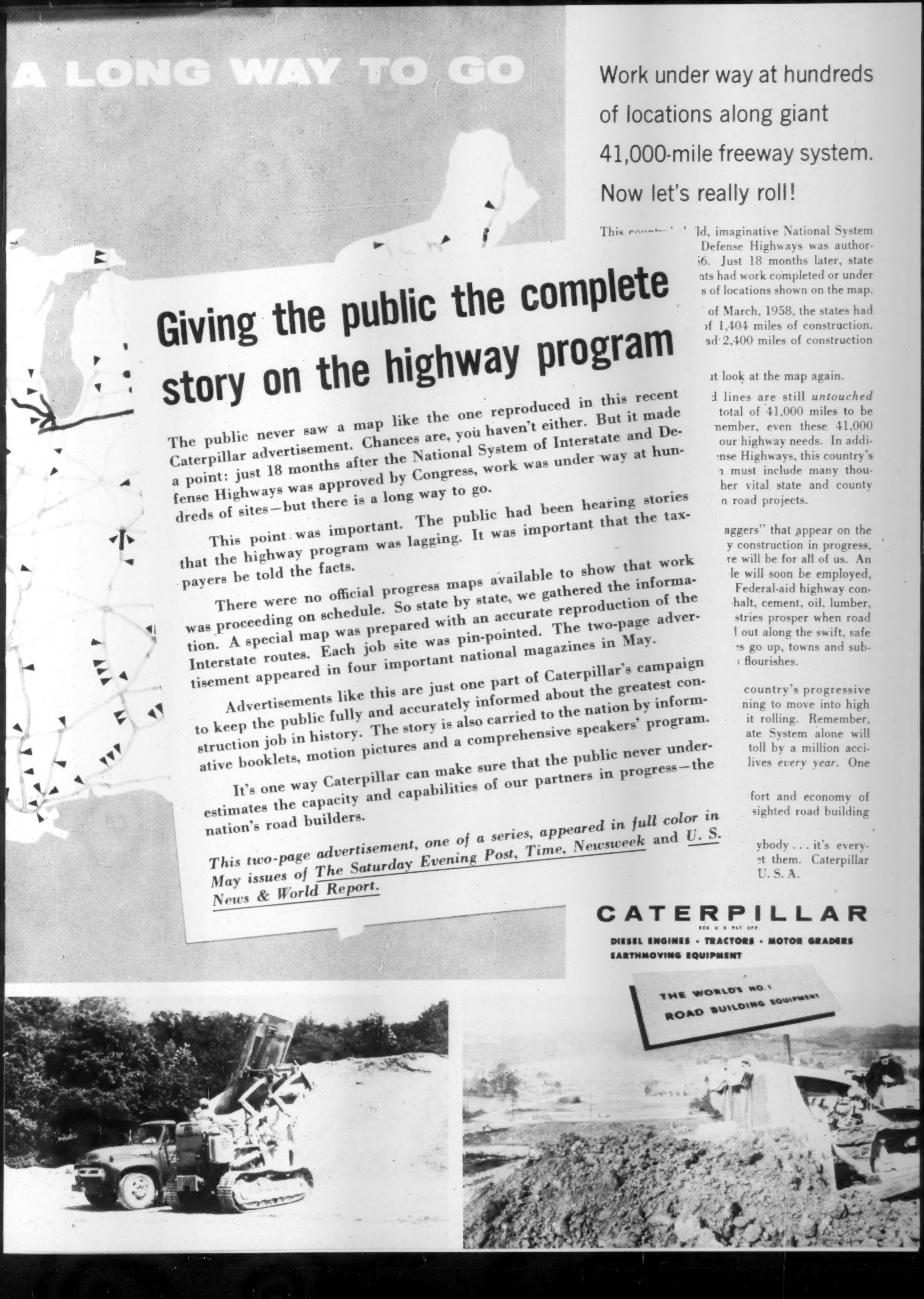
This point was important. The public had been hearing stories that the highway program was lagging. It was important that the taxpayers be told the facts.

There were no official progress maps available to show that work was proceeding on schedule. So state by state, we gathered the information. A special map was prepared with an accurate reproduction of the Interstate routes. Each job site was pin-pointed. The two-page advertisement appeared in four important national magazines in May.

Advertisements like this are just one part of Caterpillar's campaign to keep the public fully and accurately informed about the greatest construction job in history. The story is also carried to the nation by informative booklets, motion pictures and a comprehensive speakers' program.

It's one way Caterpillar can make sure that the public never underestimates the capacity and capabilities of our partners in progress—the nation's road builders.

This two-page advertisement, one of a series, appeared in full color in May issues of The Saturday Evening Post, Time, Newsweek and U. S. News & World Report.



A LONG WAY TO GO

Work under way at hundreds of locations along giant 41,000-mile freeway system. Now let's really roll!

This
ld, imaginative National System
Defense Highways was author-
6. Just 18 months later, state
nts had work completed or under
s of locations shown on the map.
of March, 1958, the states had
f 1,404 miles of construction.
ad 2,400 miles of construction

t look at the map again.
d lines are still *untouched*
total of 41,000 miles to be
nember, even these 41,000
our highway needs. In addi-
nse Highways, this country's
n must include many thou-
her vital state and county
n road projects.

aggers" that appear on the
y construction in progress,
re will be for all of us. An
le will soon be employed,
Federal-aid highway con-
halt, cement, oil, lumber,
stries prosper when road
l out along the swift, safe
s go up, towns and sub-
flourishes.

country's progressive
ning to move into high
it rolling. Remember,
ate System alone will
toll by a million acci-
lives *every year*. One

fort and economy of
sighted road building

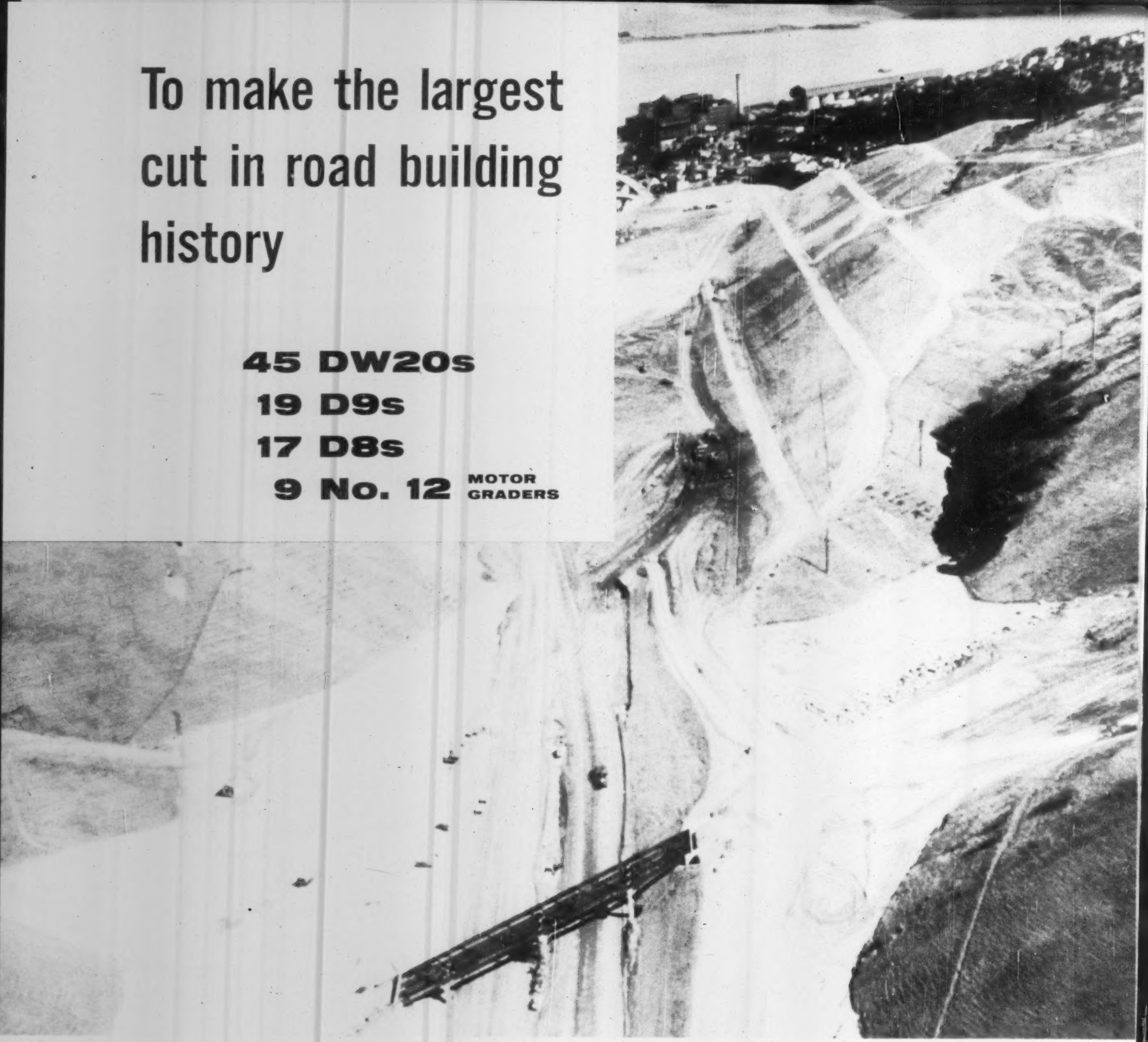
ybody . . . it's every-
t them. Caterpillar
U. S. A.

CATERPILLAR
REG. U. S. PAT. OFF.
DIESEL ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

THE WORLD'S NO. 1
ROAD BUILDING EQUIPMENT

To make the largest cut in road building history

45 DW20s
19 D9s
17 D8s
9 No. 12 MOTOR GRADERS



This cut called for moving 18½ million cu. yd. It is 1,500 feet long, 250 feet deep, a quarter of a mile across the top. It's a big, tough job. A Caterpillar job.

So it was natural that the contractors turned to Caterpillar to get the work done. The equipment roster included 45 DW20s, 19 D9s, 17 D8s and 9 No. 12 Motor Graders.

The cut is on the Richmond-Carquinez Freeway project, north of the San Francisco Bay area. But the location is unimportant. Contractors have learned through the years that no matter where you find the hard work, there, too, you will find Caterpillar machines.

This is no coincidence. These machines are the product of Caterpillar engineering, research and development all working toward a single goal—to produce the most efficient, productive, dependable equipment possible.

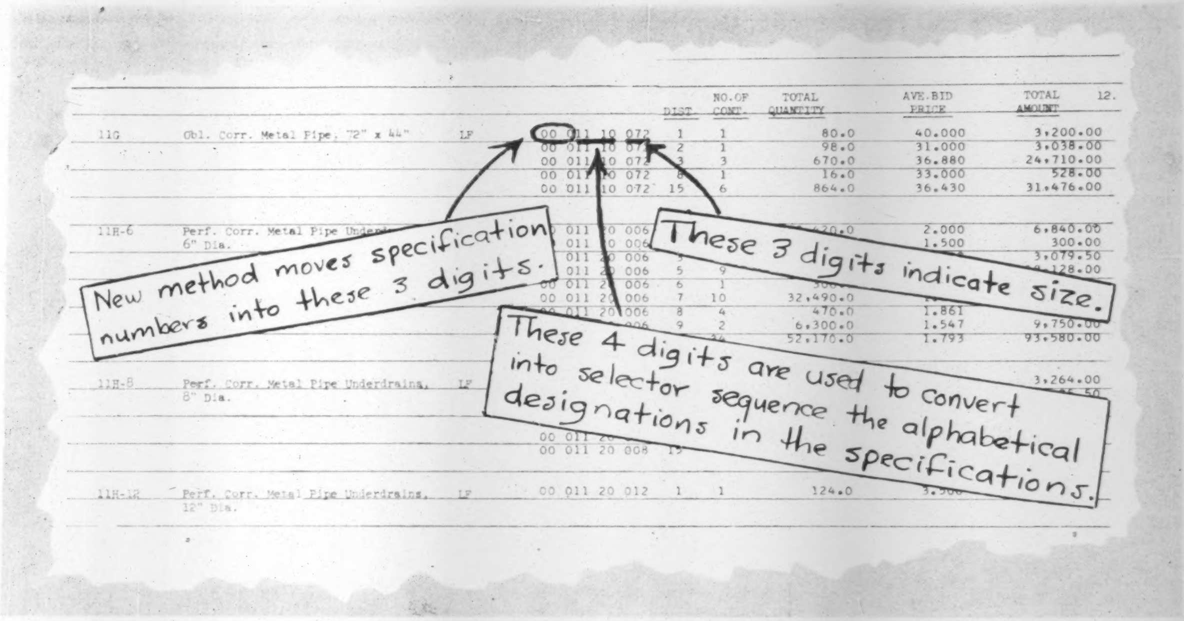
The nation turned over its gigantic highway program to you with complete confidence. It knew you had the ability and the big yellow machines to complete the job on schedule.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

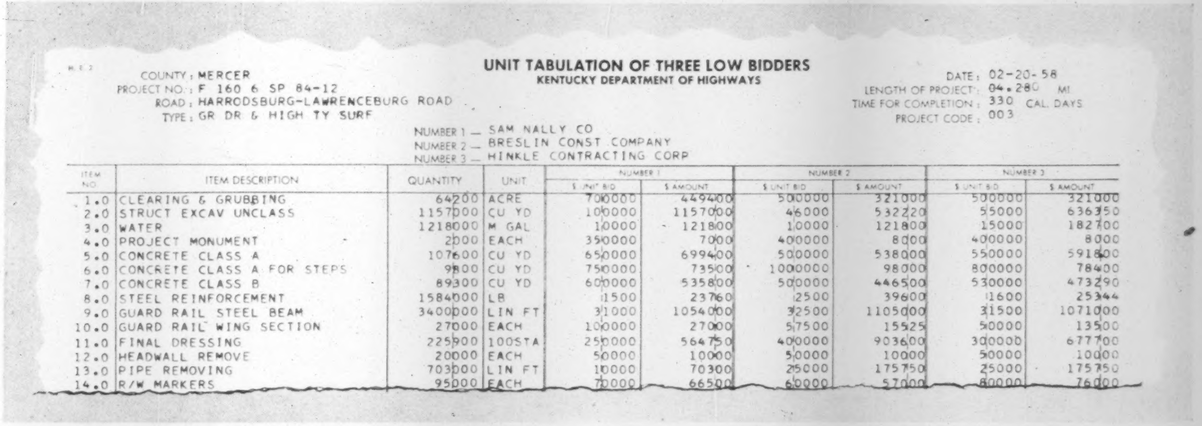
HELPING TO SPEED CONSTRUCTION OF INTERSTATE-DEFENSE HIGHWAYS


New method moves specification numbers into these 3 digits.
These 3 digits indicate size.
These 4 digits are used to convert into selector sequence the alphabetical designations in the specifications.

12.

				DIST.	NO. OF CONT.	TOTAL QUANTITY	AVE. BID PRICE	TOTAL AMOUNT
11G	Obl. Corr. Metal Pipe, 72" x 44"	LF	00 011 10 072	1	1	80.0	40.000	3,200.00
			00 011 10 072	2	1	98.0	31.000	3,038.00
			00 011 10 072	3	3	670.0	36.880	24,710.00
			00 011 10 072	8	1	16.0	33.000	528.00
			00 011 10 072	15	6	864.0	36.430	31,476.00
11H-6	Perf. Corr. Metal Pipe Under[illegible] 6" Dia.	[illegible]	[illegible] 011 [illegible]0 006	[illegible]	[illegible]	[illegible]420.0	2.000	6,840.00
			[illegible] 011 [illegible]0 006	[illegible]	[illegible]	[illegible]	1.500	300.00
			[illegible] 011 20 006	[illegible]	[illegible]	[illegible]	[illegible]	3,079.50
			[illegible] 011 20 006	5	9	[illegible]	[illegible]	[illegible]128.00
			00 011 20 006	6	1	[illegible]	[illegible]	[illegible]
			00 011 20 006	7	10	32,490.0	[illegible]	[illegible]
			00 011 20 006	8	4	470.0	1.861	[illegible]
			[illegible] 006	9	2	6,300.0	1.547	9,750.00
			[illegible]	[illegible]	34	52,170.0	1.793	93,580.00
11H-8	Perf. Corr. Metal Pipe Underdrains, 8" Dia.	LF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3,264.00
			00 011 20 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			00 011 20 008	15	[illegible]	[illegible]	[illegible]	[illegible]
11H-12	Perf. Corr. Metal Pipe Underdrains, 12" Dia.	LF	00 011 20 012	1	1	124.0	[illegible]	[illegible]

NEW YORK has electronically computed and printed weighted averages of contract prices with quantities. The '57 code is changed as shown for 1958.



UNIT TABULATION OF THREE LOW BIDDERS
KENTUCKY DEPARTMENT OF HIGHWAYS

COUNTY: MERCER
PROJECT NO.: F 160 6 SP 84-12
ROAD: HARRODSBURG-LAWRENCEBURG ROAD
TYPE: GR DR & HIGH TY SURF

DATE: 02-20-58
LENGTH OF PROJECT: 04.280 MI
TIME FOR COMPLETION: 330 CAL. DAYS
PROJECT CODE: 003

NUMBER 1 — SAM NALLY CO
NUMBER 2 — BRESLIN CONST COMPANY
NUMBER 3 — HINKLE CONTRACTING CORP

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	NUMBER 1		NUMBER 2		NUMBER 3	
				$ UNIT BID	$ AMOUNT	$ UNIT BID	$ AMOUNT	$ UNIT BID	$ AMOUNT
1.0	CLEARING & GRUBBING	64200	ACRE	700000	449400	500000	321000	500000	321000
2.0	STRUCT EXCAV UNCLASS	1157000	CU YD	100000	1157000	46000	532220	55000	636350
3.0	WATER	1218000	M GAL	10000	121800	10000	121800	15000	182700
4.0	PROJECT MONUMENT	2000	EACH	350000	7000	400000	8000	400000	8000
5.0	CONCRETE CLASS A	107600	CU YD	650000	699400	500000	538000	550000	591800
6.0	CONCRETE CLASS A FOR STEPS	9800	CU YD	750000	73500	1000000	98000	800000	78400
7.0	CONCRETE CLASS B	89300	CU YD	600000	535800	500000	446500	530000	473290
8.0	STEEL REINFORCEMENT	1584000	LB	1500	23760	2500	39600	1600	25344
9.0	GUARD RAIL STEEL BEAM	3400000	LIN FT	31000	1054000	32500	1105000	31500	1071000
10.0	GUARD RAIL WING SECTION	27000	EACH	100000	27000	57500	15525	50000	13500
11.0	FINAL DRESSING	225900	100STA	250000	564750	400000	903600	300000	677700
12.0	HEADWALL REMOVE	20000	EACH	50000	10000	50000	10000	50000	10000
13.0	PIPE REMOVING	703000	LIN FT	10000	70300	25000	175750	25000	175750
14.0	R/W MARKERS	95000	EACH	70000	66500	60000	57000	80000	76000

KENTUCKY has the most completely electronic bid tabulation so far.

Electronic Bidding: Only the Beginning

Elsie Eaves
Manager, Business News
Engineering News-Record

The electronic highway bid opening is with us. Five states, so far, check and print bidding results on electronic computers. These are Alabama, Kentucky, Ohio, Texas and Virginia. A sixth, New York, computes semi-annually weighted averages of low bid or contract prices, but not the results of individual lettings.

No two of these systems are alike; not one is tuned up as yet to the full possibilities of this new speed-up in data processing.

But this is a fast moving development. Before it settles for partial benefits, let us explore its real potential—what an idealized system could do, where uniform coding could lead us. To faster, less costly bid preparation by contractors? To faster, more timely price feed-back to estimators?

• Present state of art—Kentucky checks and prints the entire unit tabulation of complete bid summaries for the three low bidders direct from the calculator onto multilith masters. These go without further processing to the duplicating machines for the prescribed number of copies.

Alabama and Ohio check and print on paper the unit prices bid, the extensions, sub-totals and totals, strip in these columns of figures onto prepared forms, then photostat or blue print.

On none of these is uniform coding in evidence.

Texas analyzes bids on the computer but has not as yet adopted a standard code for items, tied to the specifications. Computing the Texas bid price index could be but is not now assigned to the computer. The most up-to-date of the highway price indexes, it is used to break in young engineers and make them cost conscious.

(Continued on page 72)

. . . It's a big job but the benefits would be big, too

New York has the only uniform of "standard" code in sight so far. This is tied to the specifications and uses the existing item identification system. But it is giving trouble, notably on sorting because the existing system mixes alphabet with numerical designations. The New York item coding is undergoing a major overhaul this year. A system designed from scratch to meet computer needs would save a lot of headaches.

The New York uniform code, even with its limitations, is the best available now. It uses 10 digits, one group for specification number, one group for material used or other sub-classifications (for which letters rather than numbers are used in the specifications) and one group for size. New York's "650" computer prints directly on a multilith master the weighted averages for 10 districts and the state average for each of the items that are put under contract.

The New York composite mile price index is not now computer calculated

• Possibilities great—The ultimate possibilities of this new development are national in scope, and reach out to the contractor too.

Uniform coding of items priced is the key to getting the fullest benefits out of this newest development in cost analysis and estimating.

Uniform coding would need uniform specifications. It's a big job, but the benefits would be big, too.

Now the national indexes measuring highway bid price trends lag from three to four months, since they are available only quarterly. If each state could supply decks with its average price cards key punched, national indexes could be monthly and current enough to reflect the immediate situation.

Time and cost to contractors for preparing bids could be reduced where their own cost records could be tied to uniform codes and specifications. It is conceivable that on larger projects bids could be placed on punched card decks supplied by the state with the contractor's prices and extensions added. Then such duplicate decks for the successful bidders could become the basis for the contractors, accounting, cost control and cost feedback for future estimating.

• Interest great—The highway engineers are way out in front in actually testing this application of computers to cost estimating and accounting.

But the potentialities of computers are recognized on an even broader case by the cost engineers. The American Association of Cost Engineers devoted all of Tuesday this week in its annual meeting at Cleveland to four papers and to tours of the Case Computing Center. The papers' titles—The Electronic Digital Computer; The Coming Impact of Digital Computers on Cost Engineering; Computer Processing in Preliminary Economic Evaluations; Statistics, Computers and Cost Control show how the thinking is going at the present time.

The AACE also has charged its standards committee with the job of setting up a uniform code for cost estimating and standard definitions.

A new committee on estimating and costs is being formed by the American Society of Civil Engineers. It will be organized just in time to face this new challenge.

The millenium in cost estimating and control is far from here. A uniform code is the key to a big future if use is to be made of electronic aids. But a uniform code depends on standard specifications and definitions which, of course, would be a standardizing job of colossal proportions.

Now is not too soon to get on with the job.

An idealized computer set-up . . .

Here's How It Could Work

With preliminary design completed, quantities estimated and items priced for the engineer's estimate . . .

1. Key punch a deck of cards, one card for each item in the bid.
2. Compute the engineer's estimate by extending and totaling items.
3. Gang punch decks carrying this information, one for each bidder on the project (100 cards per minute).

Then, when bids are opened . . .

4. Key punch contractor's name or number into his deck, also his unit prices for each item and his extension totals.
5. Compute (at 100 line items per minute) . . .
   A. Each extension and compare its results with contractor's.
   B. If difference shows up, punch an extra card.
   C. Read in subtotals and accumulated totals.
   D. Pick out low bid.
   E. Calculate and compare alternate bids.
6. Print results (at 150 line items per minute).
   A. Mark items with asterisk where computer extension differs from contractor's.
   B. Check and mark imbalance in bids.
   C. Print results direct on multilith master instead of paper, if duplicate copies are to be run off without additional processing.

The operation up to here is where today's pioneers are working. Surprisingly, they are finding the biggest saving where formerly manual posting of prices and extensions required multiple proofreading. This apparently tops the saving over the old method of checking mathematical extensions and totals.

Next, accounting would take over. When the contract is awarded . . .

1. Make the successful bidder's deck of punch cards the progress payment control. Operating at the rate of one minute per copy run off progress report sheets.
   A. For contractor's monthly progress payment claim.
   B. For resident engineer's monthly progress report.
2. Key punch the monthly quantity estimates into contractor's unit price deck, then the computer:
   A. Extends quantities for progress payment.
   B. Totals earnings.
   C. Deducts retained percentage.
   D. Apportions payment to the funds out of which project is financed.
   E. On completion of the job, computer processes final estimates swiftly, and avoids paper work delays on final payment to contractors.

The Committee on Uniform Accounting set up by the American Association of State Highway Officials established only last month an electronics sub-committee. To date no uniform coding has been established that would facilitate cost comparisons between jobs, or between states.

For cost control and feedback of estimating data . . .

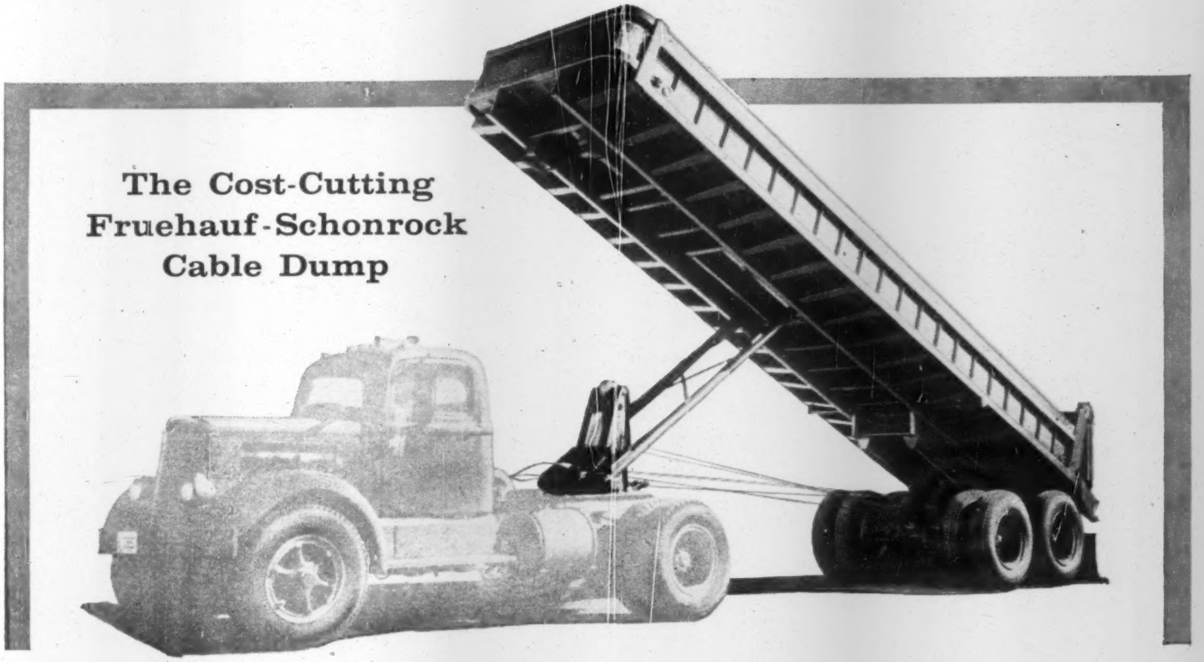
1. Give items a standard code, keyed to specifications.
2. Sort them (250 to 1,000 cards per minute).
3. Compute and print weighted average prices (200 cards per minute).

New York is already doing this.

4. Compute bid price indexes from these averages.

Nothing approaching such a complete or idealized operation is now in force. The time saving isn't yet feeding back to the estimators up to the minute bid price trends even at the state level.

Profits Go Up On Every Job With Fruehauf's New Frameless Cable Dump Trailer!



The Cost-Cutting Fruehauf-Schonrock Cable Dump

With redesigned booster fifth wheel for faster dumping with less strain on truck and cable than ever before.

●

With redesigned body frame for greater strength and increased "flex" in center beam to absorb even the greatest shock loads.

STILL THE MOST ECONOMICAL Dump Trailer in America to purchase or maintain, the simply-designed, ruggedly-built, frameless Fruehauf-Schonrock Cable Dump now has more cost-cutting, time-saving features than ever!

Faster dumping with less strain on truck and cable is achieved by new, longer booster arms and larger rollers. Higher stockpiles are provided by newly designed offset tailgate hinges, which swing the gate quickly out high and clear of the pile. Shock loads of all kinds are more easily absorbed by the tougher, more flexible body frame.

The cost of this revolutionary cable unit still remains lower than that of most competitive hoist units with or without full chassis frames. Payloads are still up to 4,000 lbs. greater because of the frameless design and bridge formula application. All wheels stay fully grounded throughout dumping, and the cables can be used to get either truck or Trailer out of mud or holes.

No other dump of any kind does so much work for so little cost!

FRUEHAUF BUILDS AMERICA'S BIGGEST LINE OF DUMPS, PLATFORMS, CARRYALLS, AND BULK TANKS FOR THE ROADBUILDING INDUSTRY.

FRUEHAUF TRAILERS

For Forty-Four Years—More Fruehauf Trailers on the Road Than Any Other Make

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☐ CABLE DUMP ☐ OTHER:________

NAME________________
COMPANY________________
ADDRESS________________
CITY________________ STATE________________

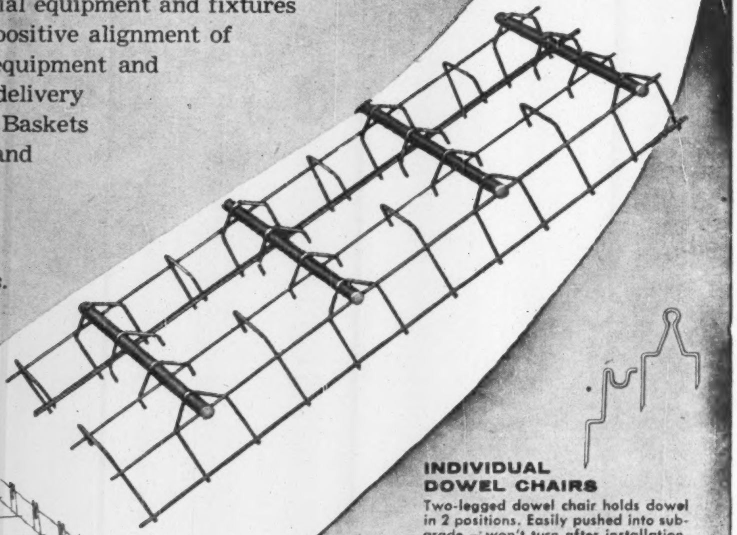
UNIVERSAL PRODUCTS

for highway construction

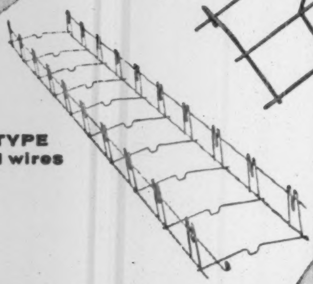
DOWEL BASKET ASSEMBLIES

Universal Dowel Basket Assemblies are designed and fabricated to specifications. Special equipment and fixtures guarantee accurate spacing and positive alignment of dowels. High speed production equipment and modern facilities insure prompt delivery of your requirements. Universal Baskets are approved by Federal, State and private authorities for highway and airport construction.

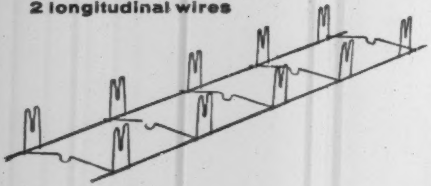
Let us quote on your requirements. Write for complete details today.



HEAVY DUTY TYPE
Maximum strength and support



STANDARD TYPE
4 longitudinal wires

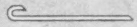


STANDARD TYPE
2 longitudinal wires

INDIVIDUAL DOWEL CHAIRS

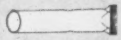
Two-legged dowel chair holds dowel in 2 positions. Easily pushed into sub-grade — won't turn after installation. Wide range of heights.

Single Leg Dowel Chair permits quick snap-in of Dowel. Sizes to support Dowel from 3" to 6" above sub-grade.



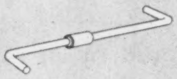
STAKE PINS

Keep Dowel Bar Assemblies in place during the pour. Lengths from 4" to 15" in 1/4" increments.



DOWEL SLEEVES

Metal Dowel Sleeves for covering 3/4" Dowel Bars; overall length covers 2½" or 3" Dowel. Special sizes and lengths available.



HOOK BOLT ASSEMBLY

For providing required tieing element along longitudinal joint. Eliminates necessity of bending tie bars or drilling road forms.

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Universal Form Clamp Co. of Canada, Ltd., 226 Norseman St., Toronto, Ontario

Second Quarterly Round up: **Highway Unit Prices**

Bidding Lively for Ohio Road

Road excavation takes almost 15% of this closely contested $3,700,000 road, drainage and bridges contract

This 5.023 mile road, drainage and structures job in Montville and Medina Townships, **Ohio**, includes five bridges. Condon-Cunningham Co., Peter Kiewit Sons Co., Cleveland, took this $3,689,196 Ohio Dept. of Highways contract on a low bid less than a fraction of a percent under the second, and 6.8% below the high of the seven bids, and 3.4% below the engineers' estimate.

The largest item in the contract is for 1,322,703 cu yd of road excavation at 41¢ a yd, almost 15% of the total contract. Over 2,000,000 lb of structural steel and another 910,000 lb of reinforcing steel will go into the five bridges.

Width of both the two roadways and the two pavements, is 24 ft.

Several farm buildings are in the path of the project, and will have to be removed.

T-71 reinforced Portland cement concrete for the pavements, and the Class C concrete for the bridges, require 6.5 sacks of cement per cu yd, and Class E concrete must contain 5.5 sacks per cu yd.

The contractor furnishes all materials. Rail transportation will be utilized, with the Akron, Canton and Youngstown Railroad 3.75 miles from the project.

Wages prevailing in Akron and Cleveland include: tractor operators, $3.49; shovel and crane operators, $3.74; common laborers, $2.915; carpenters in Akron, $3.655 and in Cleveland, $3.74.

1C	Condon-Cunningham Co., Peter Kiewit & Sons Co., Cleveland, Ohio	$3,689,196
2	B. F. Perry Constr Co., M. B. Curan Coal & Contr Co., Akron, Ohio	3,711,683
7	D. W. Winkelman Co., Inc., Akron, Ohio	3,958,051
EE	Ohio Dept. of Highways, Columbus, Ohio	3,818,900

Roadway

Bids: 4-1-48 Items	Unit	Quantity	Unit Prices 1C	2
Exc, suitable matl	cy	1,322,703	$0.41	$0.50
Subgrade, compacted	sy	204,434	0.05	0.05
Borrow	cy	314,645	0.49	0.40
Pavement, existing r	sy	4,192	1.00	0.70
Trees & stumps r	ls	job	74,200	237,000
Water	Mgal	7,164.9	3.00	1.00
Monu, centrl refer	ea	25	20.00	20.00
Underdrain, stone	lf	1,455.5	1.00	1.00
Stl bm gd rail, deep	lf	1,377.5	2.70	2.37
	lf	20,662.5	2.60	2.40
barrier rail, deep	lf	1,775	5.00	4.70
Topsoil, stockpiled	cy	3,484	0.60	0.40
12" deep pl	sy	8,500	0.43	0.20
Seeding & protecting	sy	742,865	0.05	0.05
Fertilizer, commercial	t	66.89	100.00	85.00
Sodding	sy	32,676	0.75	0.65
spec berm & slp prot	sy	312	0.75	0.80
Conduit, asb cmt, 4"	lf	523	5.00	4.00
Edge line, 4" wide	mi	15.53	90.00	85.00
Centerline, 6" wide	mi	2.87	90.00	100.00
Curb & island marking	ls	job	430.00	500.00
Delineator	ea	254	10.00	6.00
Runaround, type A	ls	job	1,370	800.00
Fence, type A	lf	38,764	0.75	0.70
Barns r	ea	2	500.00	1,000
r	ea	1	600.00	1,000
Frame house, 1 story r	ea	1	400.00	1,000
r	ea	1	500.00	1,000
1½ story r	ea	1	400.00	1,000
garage r	ea	1	200.00	1,000
coop & crib r	ea	2	200.00	1,000
Concrete slab r	ls	job	100.00	1,000
Sign board r	ea	1	100.00	1,000

Drainage

Bids: 4-1-48 Items	Unit	Quantity	Unit Prices 1C	2
Excavation, struct	cy	4,258.7	$6.50	$3.00
channel	cy	20,716.8	0.75	1.00
Pipe, 15" & under r	lf	728	1.75	1.00
over 15" r	lf	30	2.75	1.50
for driveways 12"	lf	133	3.50	3.60
Storm sewers, cl A, 12"	lf	80	5.50	4.50
12"	lf	38	4.00	4.75
15"	lf	643	7.00	5.50
15"	lf	12	4.00	4.20
18"	lf	37	7.50	7.00
21"	lf	798	6.00	6.50
21"	lf	48	9.00	7.50
24"	lf	99	11.00	8.50
24"	lf	1,222	8.00	7.25
cl A, under pavement or appr, 8"	lf	3,257	2.50	3.20
12"	lf	620	4.00	4.25
or shallow, 15"	lf	4,041	6.00	4.70
18"	lf	176	7.50	6.00
21"	lf	86	10.50	7.00
cl B, under pave, 15"	lf	253	5.00	4.50

r—remove

Bids: 4-1-48 Items	Unit	Quantity	Unit Prices 1C	2
Rdwy drainage, 6"	lf	760	1.70	1.00
8"	lf	600	2.25	1.25
10"	lf	400	3.00	1.50
pipe outlet, 12"	lf	400	4.75	2.85
8"	lf	410	3.50	2.40
Underdrain 6"	lf	84,565	1.44	1.25
pipe outlets 8"	lf	545	4.25	3.50
Pipe spec, underdr, 6"	ea	101	3.00	2.20
st sewer, 8"	ea	90	20.00	13.00
15"	ea	28	40.00	30.00
21"	ea	2	55.00	40.00
18"	ea	2	48.00	32.00
Catch basins, std #4	ea	26	385.00	425.00
#5	ea	7	290.00	350.00
#2-2A	ea	7	150.00	185.00
#6	ea	5	235.00	200.00
abandon	ea	3	40.00	20.00
Manholes, std #1	ea	3	440.00	350.00
Inlets, side ditch, std #1, mod	ea	6	70.00	100.00
Channel prot, dump rock	cy	6,269	9.50	4.00
Riprap, tp A, grouted	sy	138	8.00	9.00
Paved gutter, type 1	lf	3,756	3.50	4.00
3	lf	207	4.25	6.00
Existing struct r	ls	job	$200.00	$100.00
Conc, cl C, struct	cy	577.4	65.00	90.00
cl E, struct	cy	2.95	100.00	90.00
Steel reinforcing	lb	29,528	0.14	0.13
Pipe, rdwy culv, 24"	lf	120	6.50	8.00
30"	lf	438	9.00	10.00
30"	lf	54	8.00	10.00
30"	lf	292	8.50	10.00
36"	lf	236	12.00	14.00
42"	lf	106	15.50	20.00
48"	lf	86	19.00	22.00
8 ga, 36"	lf	496	19.00	24.00
48"	lf	314	26.00	30.00
54"	lf	312	25.00	26.00
10 ga, 42"	lf	302	19.50	24.00
48"	lf	302	22.50	26.00
48"	lf	270	23.00	30.00
10-8 ga, 60"	lf	816	42.00	43.00
10-10 ga, 60"	lf	634	41.00	42.50
12 ga, 36"	lf	352	13.50	15.00
42"	lf	360	16.90	19.00
42"	lf	384	16.00	22.00

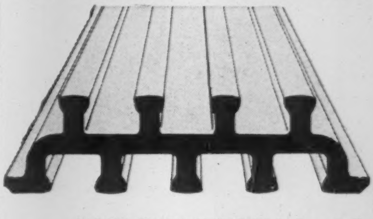
Pavement

Bids: 4-1-48 Items	Unit	Quantity	Unit Prices 1C	2
Conc median pave, 4"	sy	44	4.00	6.00
curb, std tp 6	lf	400	3.20	2.50
spec cmt, curb	lf	1,100	4.00	3.00
reinf, appr slab, 13"	sy	1,180	17.50	16.00
Shldr & approach, stab crushed aggr	cy	10,896	6.00	4.50
Subbase grading, A or B	cy	35,612	2.10	2.00
Base crse, bit mac, 3"	sy	71,412	1.35	1.20
cr aggr	cy	1,314	8.80	6.63
Asph conc leveling crse	cy	62	29.00	23.56
RCC pavement, 10"	sy	119,149	6.47	6.00
9"	sy	5,579	6.45	6.40
Bit surf treat, bit matl	gal	35,588	0.25	0.182
aggr #6	cy	571.5	8.00	5.40
#46	cy	571.5	8.00	5.40
matl, road mix	gal	7,141	0.25	0.212
seal coat	gal	1,623	0.25	0.212

(Unit Prices continued on p. 76)

LABYRINTH® WATERSTOPS

A SOUND INVESTMENT FOR CONCRETE CONSTRUCTION!



LABYRINTH AVAILABLE IN 2, 3 or 4 rib.

ON YOUR CONSTRUCTION:

1. Consider the investment in design, materials and labor (to mention a few).

2. Then consider how important safe, secure *watertight* concrete joints are.

3. Thorough watertightness *can* be secured by installing Labyrinth Waterstops—a dividend that makes the low initial cost of the product insignificant when compared to your total investment—and one that insures watertight concrete joints for years!

- Corrugated ribs grip concrete, insure an everlasting bond between joints.
- Finest polyvinyl plastic resists chemical action, aging, severe weather.
- Takes just seconds to nail to form . . . easy to cut and splice on location (prefabricated fittings available).
- There's a Water Seal product for every type of concrete work!

If your aim is to stop water seepage, *stop it effectively with Water Seals' Waterstops!*

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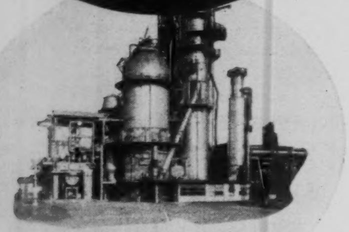

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Sales offices throughout the U. S. A., licensees and sales offices in many foreign countries including Argentina, Belgium, Brazil, Canada, Columbia, Egypt, England, France, Haiti, Italy, Japan, Mexico, Netherlands, Peru and West Germany

. . . Lively bidding–Ohio

Bids: 4-1-48 Items	Unit	Quantity	Unit Prices 1C	2
Pavement (cont'd)				
Aggr 46, road mix	cy	363	8.00	6.00
6 or 9, choke	cy	26	8.00	6.00
6, seal	cy	52	8.00	6.00
Asph conc surf crse, tp A	cy	76	25.00	23.56
Bit prime coat	gal	2,902	0.25	0.212
Traf compact surf crse	cy	1,000	4.35	2.00
Cal chlor or cal magn chlor	t	20	60.00	50.00

Bids: 4-1-48 Items:	Unit	Quantity	Unit Prices 1C	2
Miscellaneous				
Prem on RR & subdivs liab ins	ls	job	1,000	1,000
industrial ins	ls	job	8,000	5,000
Constr layout stakes	ls	job	27,000	20,000
Maint traffic, incl lts, signs, barricades, watchmen, 24 hr serv	ls	job	16,500	8,000

Bridges

Bids: 4-1-58 Items	Unit	Quantities Bridge MED 1-1450	Bridge MED 1-1499	Bridge MED 1-1529	Bridge MED 1-1569	Bridge MED 1-1685	Unit Prices 1C	2
Cofferdam, cribs & sheeting	ls	......	job	......	......	......	$21,250	$5,000
Excavation, uncl	cy	980	1,468	267	870	1,045	6.00	6.00
Conc, cl C, superstructure	cy	391	613	......	390	488	75.00	74.00
	cy	......	......	211	......	......	60.00	65.00
piers above footgs	cy	156	246	......	153	206	80.00	87.00
	cy	......	......	73	......	......	80.00	90.00
cl E, abuts above footgs	cy	174	163	......	205	147	65.00	70.00
abutments	cy	......	......	83	......	......	65.00	75.00
piers & abut footgs	cy	326	357	......	284	380	50.00	38.00
	cy	......	......	161	......	......	50.00	37.00
Memb waterprfg, tp d, 5 ply incl protection & wire mesh	sy	......	......	540		......	10.00	10.60
Steel, reinforcing	lb	178,300	271,136	52,812	181,424	226,581	0.12	0.13
structural	lb	305,500	572,200		304,900	357,159	0.15	0.15
	lb			514,800			0.20	0.15
field painting	lb	305,500	572,200	514,800	304,900	357,159	0.005	0.0045
Alum rail & supps, conc parapets & end posts & reinf stl	lf	656	1,001	......	684	828	12.00	12.50
Pile test, first	ls	job	job	job	......	job	2,000	500.00
Conc piles, cip, 12"	lf	4,480	6,280	3,240	......	5,040	5.50	6.00
Backfill, porous	cy	78	64	20	71	63	10.00	7.00
Slope facing, tp S 29 05	ea	330	308	103	340	216	10.00	10.50
Bridge delineator	ea	3	4	......	3	4	20.00	10.00
Track drains, complete	ea	......	......	8	......	......	165.00	150.00
Settlement platf, incl monument box	ea	......	4	......	......	......	300.00	180.00

Ten-Year Price Trends–State Highway Commission Washington–1949–1st Quarter 1958

Average Unit Prices for Federal Aid Contracts

Items	Unit	1949	1950	1951	1952	1953	1954	1955	1956	1957	1st Quar, 1958
Exc, common, 600′ FH	cy	$0.305	$0.268	$0.332	$0.276	$0.278	$0.298	$0.288	$0.283	$0.297	$0.31
unclass, 600′ FH	cy	0.433	0.253	0.341	0.451	0.452	0.419	0.370	0.470	0.400	0.25
S.R., 600′ FH	cy	1.030	0.935	1.178	1.309	1.433	0.954	0.710	1.467	1.742	2.65
Borrow, comm, incl haul	cy	0.392	0.412	0.459	0.726	0.437	0.630	0.655	*0.340	0.367	0.24
S.R., incl haul	cy	1.415	1.500	2.500	1.536	...	...	1.800	*1.500		...
Exc, structure, 600′ FH	cy	2.434	2.253	2.840	2.498	2.323	2.175	2.151	2.751	2.055	2.08
common trench, 600′ FH	cy	1.386	1.314	1.457	1.472	1.113	1.373	1.054	1.902	1.299	0.59
S.R. trench exc	cy	4.581	3.378	3.250	3.303	4.215	1.315	2.864	7.667	1.701	1.42
Overhaul stas	cy	0.016	0.012	0.016	0.015	0.013	0.013	0.011	**0.397	0.373	0.35
M stas M	cy	4.926	3.392	4.144	4.051	3.619	3.917	3.406			
Slope treat	lf	0.145	0.115	0.133	0.128	0.118	0.100	0.117	0.135	0.132	0.10
Roadway, finishing	stas	12.436	9.151	11.117	9.774	10.842	9.370	10.050	11.367	11.828	11.67
select borrow	t	0.787	0.616	0.803	0.835	0.687	0.897	0.913	0.840	0.882	0.52
Ballast	t	1.188	1.002	1.235	1.219	1.248	0.939	1.170	1.306	1.080	1.33
Cr stn surf base crse	t	1.815	1.418	1.550	1.440	1.417	1.235	1.225	1.361	1.296	1.04
top crse	t	1.687	1.537	1.714	1.608	1.590	1.447	1.465	1.549	1.324	1.43
filler	cy	1.232	1.054	0.990	1.036	0.660	0.943	1.111	1.282		
Water	Mgal	2.233	2.202	2.366	2.124	1.661	1.615	1.553	1.971	1.452	1.90
Light bit surf treatment prep, constr, finish	mi	263.03	199.273	266.148	229.646	252.629	275.587	264.760	219.534	276.075	245.92
cement	t	41.17	39.007	42.607	43.337	43.098	42.366	43.182	45.812	49.269	48.22
cover stn from stockpile pl	cy	1.464	1.220	1.591	1.417	1.390	1.602	1.566	1.908	1.597	1.40
Asph concrete, type I-1	t	7.800	6.469	8.290	6.796	6.558	6.333	6.661	6.665	6.757	6.55
Non-skid single seal treat bit cmt, in place	t	41.02	38.277	41.540	42.715	42.635	41.886	43.144	44.982	.....	....
minus aggr pl	cy	1.518	1.298	1.416	1.604	1.885	1.375	1.449	2.299	.....	....
One crse cmt conc pavement std 14 day, 8"	sy	3.048	2.713	3.392	3.289	3.366	3.053	3.295	4.528	3.993	3.80
reinforcement	lb	0.112	0.116	0.122	0.118	0.118	0.112	0.117	0.121	0.130	0.12
dowel bars with caps	ea	0.408	0.346	0.417	0.406	0.383	0.448	0.551	0.864	0.562	0.50
Culv pipe, corr, 12" pl	lf	2.105	2.493	2.882	2.537	2.983		2.380	2.367	2.066	2.25
18" pl	lf	3.727	3.404	4.170	4.072	3.580	2.995	3.195	3.979	3.613	3.02
24" pl	lf	5.912	5.187	6.094	6.733	5.725	5.345	5.115	5.541	5.582	6.76
conc, 12" pl	lf	1.901	1.641	2.087	1.902	1.867	1.876	1.914	2.243	1.970	1.77
RC, 18"	lf	3.418	3.363	3.834	3.721	3.785	3.809	3.759	4.357	4.507	4.06
24"	lf	5.341	5.406	5.987	6.123	5.823	5.957	5.748	6.388	6.802	6.46
30"	lf	6.922	7.860	8.842	8.402	8.380	7.971	7.602	8.390	9.871	8.76
36"	lf	9.802	9.522	11.584	12.238	10.924	10.292	10.685	12.268	11.498	12.87
24" ext str	lf	6.690	6.374	.....	7.641	.....	10.000	.....	7.500	7.385	7.00
Conc, cl A, culv, etc	cy	58.223	55.128	65.865	61.412	55.047	69.167	61.851	65.430	64.670	45.66
B, culv, etc	cy	68.692	.....	.....	59.076	62.768	41.694	61.437	55.582	50.50	51.36
Stl reinf bars, culv., etc	lb	0.122	0.111	0.133	0.126	0.115	0.126	0.124	0.132	0.146	0.13
Bridges											
RC bridge railing	lf	7.795	8.065	7.566	8.272	8.028	7.848	7.728	6.935	8.852	.....
Concrete, cl A	cy	57.248	59.587	65.731	62.184	66.774	65.441	60.452	63.706	60.371	63.37
B	cy	61.419	42.459	43.810	51.006	52.292	44.547	48.216	49.965	50.195	40.06
D	cy	40.322	32.013	27.028	38.829	42.870	38.020	40.567	28.956	30.031	26.82
F	cy	36.508	31.161	32.811	33.147	42.717	31.978	30.296	50.000	40.000	43.97
H	cy	23.465	24.477	20.781	30.479	33.054	21.330	28.252	41.621	34.043	32.90
Steel reinf bars	lb	0.099	0.096	0.113	0.109	0.107	0.102	0.098	0.122	0.135	0.12
Struct steel, carb, silic, low alloy	lb	0.195	0.161	0.229	0.246	0.218	0.204	0.218	0.266	0.284	0.24

* Item changed to "incl 600′ FH"
** Item changed to "per unit"

(Unit prices continued on p. 80)

thanks to XEROGRAPHY...

Frank W. Springsteen, left, senior planning delineator, points out to Joseph F. Reilly, director of the bureau of office services in N. Y. State's department of public works, the high quality and contrast of an 11" x 17" reduction run off on an offset duplicator from a paper master prepared xerographically from an original 22" x 34" highway drawing.

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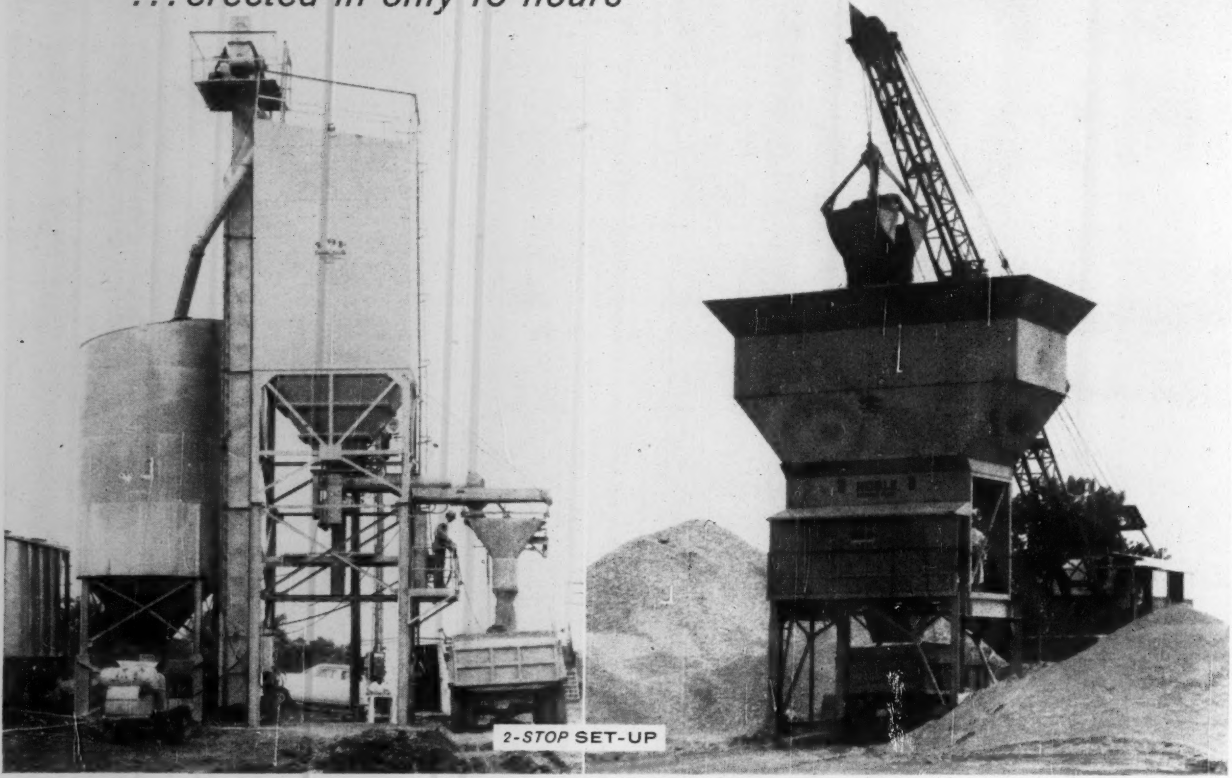

Martin K. Eby Construction Co., Wichita, Kansas, required a batching plant to supply concrete for a 100,000 square yard extension of airfield runways at Rosecrans Field, St. Joseph, Missouri. Their NOBLE plant having completed a job at Wichita, Kansas, 300 miles away, was dismantled in 10 hours, transported by rail to St. Joseph, Missouri, and reassembled in only 16 hours on low-cost slab footing. The plant batches sand, aggregates and cement in a *2-stop* set-up. The cement batcher weighs, records and discharges 742 lbs. of cement in 12 second cycles. The twin aggregate batcher weighs, records and discharges 4300 lbs. of materials in 15 second cycles. Plant output is over 300 cubic yards per hour. Overhead aggregate bins are charged with a 3½ cubic yard clamshell bucket. Scales, controls, electrical system and other major components are factory installed.

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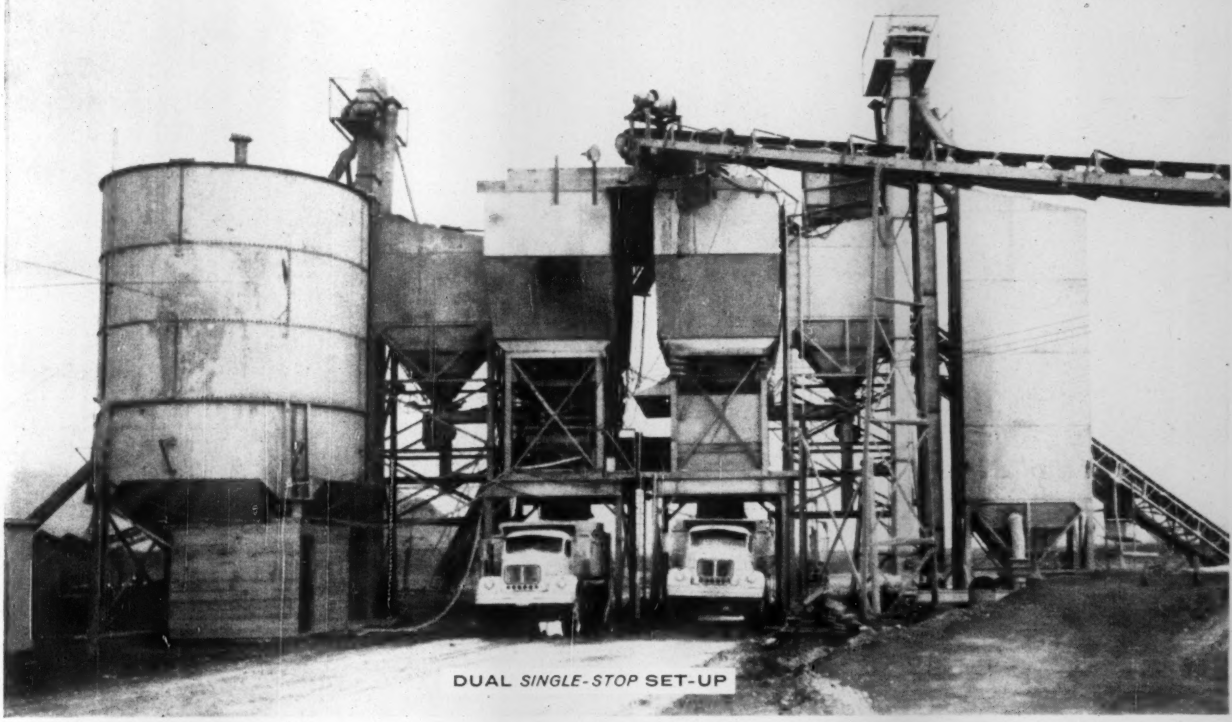

DUAL *SINGLE-STOP* SET-UP

Two NOBLE plants are batching materials for the construction of 258,000 cubic yards of portland cement concrete pavement at Mather Air Force Base, California. Operating considerably under capacity, the plants load dry batch trucks supplying 4 dual drum pavers. 3 different materials . . . 1½" rock, ¾" rock, sand . . . are stockpiled separately and supplied to both plants by three independent conveyor systems operated by one man. Each plant batches both cement and aggregates and has 150 tons of overhead aggregate storage and 375 barrels of overhead cement storage. Separate ground silos store an additional 3,600 barrels of cement. From its former location at McClellan Air Force Base, California, one of the NOBLE plants was dismantled, loaded and hauled by trucks within legal highway width to Mather Air Force Base, reassembled and put into operation all within 10 days, reports Henry J. List, Project Manager for Gordon H. Ball, Inc., general contractor.

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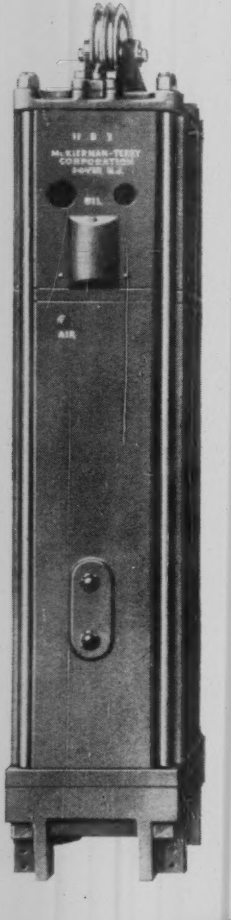

McKIERNAN-TERRY CORP.
80 RICHARDS AVE., DOVER, N. J.

Second Quarterly Round up: ▶ **Highway Unit Prices**

Highway Bid Price Trends in New York

Selected Unit Prices for 1948-57 Showing weighted Averages of Contract Prices, from 10 Districts. Department of Public Works, Division of Construction, State of New York.

Items	Unit	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1957 range
Applying water	Mgal	$2.61	$2.16	$1.77	$1.71	$1.73	$2.04	$2.16	$2.22	$2.79	$2.35	$1.96– $3.08
Excavation uncl	cy	0.68	0.65	0.72	0.63	0.89			0.55	0.87	0.82	0.57– 1.12
with moisture control	cy	0.52	0.61	0.49	0.57	0.55	0.88	0.70	0.56			
trench, culv & bridge	cy	2.35	3.40	2.22	2.35	2.79	4.01	4.49	2.36	3.91	3.86	2.61– 4.63
Overhaul	sy	0.006	0.004	0.006	0.006	0.0038	0.0021	0.0057	0.0044	0.01	0.004	0.001– 0.008
Trimming road section	lfrd	0.32	0.37	0.37	0.29	0.41a	0.47a	0.51	0.44	0.59	0.56	0.13– 0.70
Preparing fine grade	sy	0.18	0.21	0.20	0.20	0.26	0.31	0.27	0.241	0.27	0.26	0.22– 0.37
Sewer pipe vit 4"	lf	0.65	0.61	0.94	0.98	1.19	1.50	1.53	1.16		2.07	1.75– 3.00
6"	lf	1.63	1.32	1.51	1.64	1.66	2.00	1.40	1.73	2.26	2.61	1.25– 4.00
8"	lf	1.69	1.77	1.70	2.45	1.87	2.50	1.39	2.00	3.23	3.14	1.70– 4.00
10"	f	2.46	1.93	2.91	3.46		3.06	3.00	2.03	4.69	3.81	2.50– 6.00
12"	lf	3.28	2.53	2.91	3.45	5.25	3.26	2.37	2.72	5.17	7.13	4.00– 8.02
15"	lf	4.00	3.36	3.91	4.47	5.00	5.06	3.72	3.44	7.54	11.66	
18"	lf	4.89	5.26	5.04	5.55	7.00		7.00	5.61	11.50	10.96	7.01– 13.07
24"	lf	6.15	7.54	7.89	9.47	13.00	15.00	7.00	7.44	16.36	24.42	
Underdrain VCP 4"	lf	0.78	1.01	0.85	1.25	0.77	0.98	0.99	0.60	1.00	1.00	
6"	lf	1.17	1.18	1.06	1.41	1.06	1.22	0.95	1.38			
C or V opt 4"	lf	0.89	1.14	0.73	1.07	1.14	0.88	1.01	0.96		0.69	0.60– 1.75
6"	lf	1.15	1.31	1.33	1.23	1.01	1.28	1.03	0.97		1.14	0.95– 1.32
Cor met pipe heavy 12"	lf	3.88	4.14	3.41	3.56	4.13	4.74	4.14	3.99	4.49	4.61	4.35– 4.93
15"	lf	5.13	4.56	3.73	3.96	5.00	5.95	5.26	4.56	5.41	5.64	5.00– 6.00
18"	lf	6.31	5.30	4.66	5.31	4.98	6.69	5.89	5.31	6.53	6.40	5.86– 6.95
24"	lf	8.31	7.68	7.75	8.63	8.33	10.04	8.20	9.36	9.99	10.57	8.50– 11.64
30"	lf	10.36	9.69	10.70	10.00	12.74	16.16	12.88	15.48	15.10	15.11	13.35– 18.68
36"	lf	12.61	11.55	13.50	15.00	15.95	17.84	15.00	17.58	19.05	17.75	14.00– 20.00
42"	lf	14.73	13.00	16.50	25.00	17.00	20.00	19.61	23.00	22.13	29.10	20.00– 30.00
Cast iron pipe 6"	lf	6.80	4.55	4.23	5.09	4.03	4.77	4.94	4.60	5.02	5.66	3.50– 7.27
8"	lf	4.67	4.95	5.06	6.89	5.55	5.78	5.40	6.11	6.19	6.51	3.50– 15.00
10"	lf	7.01	5.75	6.81		6.19	7.00	8.32	5.30	8.25	8.88	7.00– 15.00
12"	lf	8.33	7.01	7.29	9.81	7.59	8.19	7.21	8.23	10.66	10.85	8.00– 12.00
16"	lf	12.11	8.48	6.48	12.45		8.95	9.69	11.00	12.62	14.11	12.00– 20.00
18"	lf	8.89	11.78	10.08	12.79	15.72	10.03	13.48		10.00	14.00	12.00– 15.98
20"	lf	12.93	16.11	11.67	14.02	18.11	11.42	13.86	11.00	14.00	16.00	
24"	lf	15.11	16.09	11.85	22.64	28.31	22.30	14.82		17.82	19.86	18.00– 30.00
36"	lf	16.00	26.00	24.84	28.00		41.85		36.91	43.47	39.69	38.00– 45.00
Reinf conc culv pipe 12"	lf	2.93	3.43	3.40	3.78	4.00	4.14	4.20	3.72	4.49	4.34	3.50– 7.11
15"	lf	3.91	3.99	3.32	4.54	4.30	4.42	5.28	3.97	4.86	6.88	4.33– 7.27
18"	lf	5.75	5.31	4.87	5.44	5.77	6.18	5.86	5.73	6.13	7.29	6.23– 8.10
21"	lf	5.44	6.70	5.90	6.35	7.87	7.60	8.21	6.34	8.36	7.55	7.00– 9.00
24"	lf	7.92	7.57	6.80	7.90	8.16	8.84	8.49	8.67	9.12	9.79	8.39– 12.08
30"	lf	11.12	10.56	9.48	11.42	12.27	12.32	12.08	11.57	13.22	13.95	12.00– 18.03
35"	lf	15.23	13.09	11.96	13.53	14.37	14.81	14.68	14.40	14.65	16.82	15.25– 18.66
42"	lf	16.91	18.76	14.62	16.60	18.41	18.93	18.22	20.62	17.86	21.99	20.13– 24.00
48"	lf	18.04	20.04	18.90	19.74	22.48	23.37	23.96	24.59	26.29	27.01	24.55– 29.53
54"	lf	27.68	29.09	19.02	24.44	26.21	27.89	26.74	28.54	25.68	30.11	27.99– 36.49
60"	lf	25.74	30.11	25.00	30.65	30.27	32.43	31.94	35.02	32.94	39.53	37.68– 45.71
72"	lf	40.00	44.65	40.00	41.28	42.45	48.27	41.55	41.74	45.69	58.71	52.00– 61.50
Reinf conc sewer pipe 12"	lf	2.58	2.79	2.97	3.87	4.16	3.76	3.64	4.24	4.50	4.04	3.92– 5.50
15"	lf	3.53	5.72	3.68	4.75	4.90	4.70	4.91	5.64	5.52	4.41	4.30– 6.25
18"	lf	4.02	4.55	4.28	5.44	5.83	5.96	5.25	5.89	6.30	6.11	5.82– 7.00
21"	lf	5.24	4.50	5.20	9.15	6.63				9.79	6.38	6.35– 7.00
24"	lf	6.14	6.60	5.84	8.33	7.85	7.83	7.35	7.70	10.00	8.64	6.50– 10.00
30"	lf	9.86	9.36	7.41	10.00		11.63	10.26	11.50	13.57	12.52	9.00– 14.04
36"	lf	9.04	11.92	10.80	11.25	14.30	13.29	13.54	11.70	16.61	12.00	
Portland cement:												
Type 2	bbl	3.64	3.76	3.58	3.90	4.20	4.34	4.34	4.24	4.69	5.05	4.32– 5.56
Type 2A	bbl	3.32	3.45	3.58	4.06	4.09	4.39	4.43	4.58	4.60	4.96	4.64– 5.73
Type 3	bbl	4.99	4.44	4.33	5.00	5.00	4.68	4.49				
Type 6, 6A	bbl	8.53	8.49	5.43	10.00	9.99	9.53	11.04	11.31	11.08	12.06	10.00– 13.81
Type N	bbl	4.05	4.21	3.89	4.26	4.40	4.37	4.90	4.97	5.25	5.52	4.91– 6.12
Conc for struct cl 1A	cy	39.85	41.73	39.32	46.26	52.87	57.92	49.06	48.10	56.45	63.23	56.74– 71.17
for railings	cy	108.47	133.31	88.67	94.53	125.64	137.91	135.77	100.00	133.00	133.33	100.00–150.00
Cl 1	cy	35.58	36.93	33.48	38.00	45.47	46.18	46.23	47.86	51.69	53.02	44.29– 67.09
Cl 2	cy	36.40	27.02	27.68	43.05	43.65	46.17	34.18	33.45	46.71	44.74	28.92– 78.85
Cl 3	cy	34.72	24.10	26.84	35.48	27.91	30.87	31.63	24.66	28.71	35.95	27.50– 60.00
Masonry, stone	cy	130.14	145.38	133.89	139.05	140.44	153.90	160.66	155.00	120.00	195.73	100.00–220.00
Rub stone, ld with mortr	cy	42.17	50.09	46.03	48.31	48.09	59.36	65.60	50.44	50.75	39.30	20.00– 57.69
laid dry	cy	18.51	55.93f	22.05	30.61	41.72	50.97	35.96	40.00	56.00	32.45	28.60– 32.49
Metl reinf, conc pave	sy, p	0.56	0.57	0.52	0.66	0.66	0.76	0.86	0.81	0.85	0.87	0.75– 9.80
Steel fab reinf, 6x6—#6 ga	sy	0.51	0.55	0.54	0.67	0.69	0.74	0.71	0.75	0.88	0.98	0.60– 1.16
Bar reinf, conc pave	lb	0.11	0.12	0.11	0.141	0.152	0.141	0.162	0.123	0.16	0.19	0.15– 0.23
Opt. trans jt supports	lfjt.	0.90	0.93	0.92	1.12b	2.41	1.69c	1.79	1.61	1.63	1.68r	1.52r– 1.90r
Longit jt supports, opt	ea	0.20d	0.29d		0.83	0.80	0.80	0.82	0.79	0.70	0.80	0.64– 1.00
Bar reinf for structures	lb	0.118	0.126	0.114	0.133	0.133	0.139	0.139	0.133	0.16	0.159	0.142– 0.168
Spiral bar reinf	lb	0.58	0.87	0.80	1.09	0.91	0.82	0.71	0.60	9.64	0.79	0.60– 1.00
Structural steel	lb	0.151	0.143	0.16	0.174	0.18	0.187	0.172	i	0.22	0.22	0.18– 0.29
Misc metals	lb	0.21	0.24	0.20	0.221	0.27	0.270	0.27	0.26	0.26	0.31	0.25– 0.54
Pile shoes, f&p	ea	8.36	8.23	8.61	6.67	8.22	15.00		5.00	7.28		
Opt. guide railing	lf	1.98	2.15	1.99	2.28	2.48	2.82	2.98	2.44	2.70	2.73	2.54– 3.25
Opt. guide posts	ea	7.46	8.20	8.23	8.23	8.78	9.03	9.15	9.02	9.19	9.45	8.84– 10.10
Fndn crse ROB gravel	cy	1.60	1.64	1.33	1.33	1.69	1.87	2.44	1.78	1.96	2.30	1.79– 3.83
Bott crse broken stone	cy	7.25	6.07	6.40	7.22	7.27	7.12	6.77	6.16	8.00	7.63	7.16– 13.17
bit mac pen meth asph	cy	7.30	6.72	6.41	8.07	8.41	8.10	8.08	8.02	8.30	8.33	7.23– 11.00
Conc fndn for pavement	cy	9.73	10.25	8.64	10.97	10.90	11.23	12.46	12.02	12.69	14.04	12.50– 15.49
Cmt conc pavement	cy	10.17	10.96	9.35	10.64	10.96	12.32	12.63	16.00	28.40	33.65	26.43– 49.79
with carbon black	cy	11.63	12.63	10.34e	12.92	12.32	12.92	14.76	14.15	14.77	15.03	13.40– 17.07
Asphalt concrete tp 2A	t	11.17	9.24	9.88	10.50	10.92	11.15	11.52	10.36	9.70	10.72	9.45– 10.84
opt	t	8.87	9.56	10.00		10.04	10.82	10.06	10.50	13.00		
Top crse bit mac tp 1, pen method hot asph	cy	8.00	7.56	7.94	8.38	8.20	9.74	8.04	9.25	8.06	8.38	7.33– 10.00
Membrane waterproofing	sy	2.90	2.60	1.85	2.53	2.09	1.89	1.73	2.10	2.72	3.19	2.87– 4.50
Prot crse for membr waterproofing	sy	4.13	3.98	2.96	2.92	3.25	2.46	4.03	4.00	4.53	3.99	2.00– 6.00
Bit matl, A paving	gal	0.183	0.18	0.162	0.171	0.181	0.184	0.184	0.180	0.19		
T road tar	gal	0.193	0.19	0.22	0.207	0.224	0.246	0.215	0.172	0.25	0.264	0.255– 0.324
T road tar	gal	0.195	0.20	0.20	0.208	0.23	0.257	0.244	0.217	0.25	0.261	0.256– 0.321
Stone filling	cy	3.52	3.79	3.72	4.77	7.34	7.77	5.37	2.74	4.81	5.99	4.52– 13.61

(Unit Prices continued on page 82)

No materials handling problems here—because there are no interior columns in this spacious 50′ x 140′ warehouse for S & M Farm Supply, Inc., Homestead, Florida. Translucent Stran-Lite panels provide plenty of interior light even on cloudy days.

CHOOSE WEATHER-TIGHT WALL-TO-WALL WAREHOUSING

with rugged, attractive Stran-Steel Buildings

When you choose a firesafe Stran-Steel Rigid Frame building for your warehouse (or for any other use), you get an extra-rugged structure that fits your own specifications—and usually for less cost than renting! Inside its handsome, easily insulated *Stran-Satin* walls you get full wall-to-wall warehousing . . . no columns to obstruct handling or storage operations.

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As little as one-fourth down delivers this versatile, durable building—and the Stran-Steel Purchase Plan provides as long as five years for the balance, while the building works for you! Your regular credit lines are not affected. Mail the coupon now for more information or call your Stran-Steel dealer. He's listed in the Yellow Pages under *Steel Buildings* or *Buildings—Steel.*

Stran Steel

Dept. 27-38

STRAN-STEEL CORPORATION

Detroit 29, Michigan • Division of

NATIONAL STEEL CORPORATION

Built to last, this rugged Rigid Frame building has a trim luxury look, too. Balcony, office and sales area are included in the roomy 14′ eave-height structure. Construction time: just three weeks. Building in use 17 days after delivery of steel. Can easily be expanded.

Stran-Steel Corporation, Dept. 27-38
Detroit 29, Michigan

Please send your complete Industrial Buildings Catalog.

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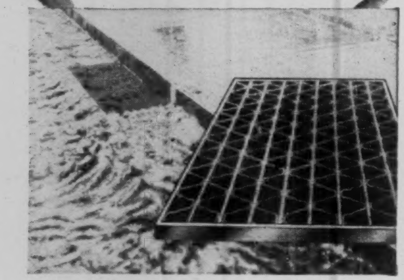
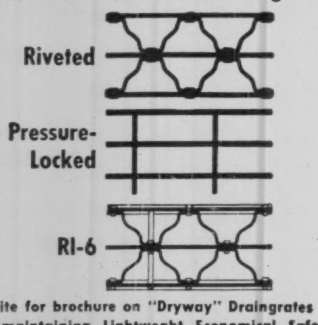
FLOODED HIGHWAYS
HINDER TRAFFIC



OLD heavy cast iron draingrates, averaging at best 40% clear opening, often fail to carry off rain water fast enough during heavy downpours, resulting in flooded highways—particularly at underpasses. Also, cracked draingrates must be replaced.

With open steel mesh draingrates, larger clear openings reduce the likelihood of flooded highways considerably. Irving "Dryway" Draingrates are 75% open for greater drainage and are made of steel bars on edge, not subject to cracking.

Available in three basic designs:



Write for brochure on "Dryway" Draingrates
Self-maintaining, Lightweght, Economical, Safe

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IRVING SUBWAY GRATING CO., Inc.
Originators of the Grating Industry

Offices and Plants at
5063 27th St., LONG ISLAND CITY 1, N. Y.
1863 10th St., OAKLAND 23, CALIFORNIA

. . . Highway bid price trends—New York

Items	Unit	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1957 range
Dry stone paving, joints filled with sand	sy	4.14	4.35	4.46	4.55	5.37	5.83	6.32	6.43	6.45	6.80	5.06- 10.00
Riprap, dry	cy	11.53	14.89	9.25	9.42	13.09	13.70	13.97	13.10	15.74	16.38	13.54- 20.25
grouted	cy	12.70	24.51	11.27	20.78	16.29	18.73	17.44	18.55	16.05	21.02	15.00- 25.12
Sheet piling timber	sf	0.81	1.08	0.54	0.94	0.88	1.24	0.71	1.11	0.98	1.83	1.57- 2.00
temporary	sf	0.42	0.50	0.26	0.32	0.40	0.64	0.70	0.45	0.58	0.33	0.19- 3.00
Timber piles, untreated	lf	1.66	1.63	1.47	1.52	2.03	2.32	1.69	1.37	1.80	1.86	1.00- 3.00
creosoted	lf	3.04	2.30	2.74	2.90	3.04	3.37	2.26	2.57	2.43	.....	......
Piles, conc 12"x¼" shell, cip	lf	4.15	5.35	4.65	.....	5.78	5.94	5.05	5.30k	5.63k	5.42k	5.40k 8.06k
Cleaning existing pavement	mi	146.40	153.88	96.26	124.30	144.43	139.84	112.57	140.00	133.00	125.05	70.08-287.94
	sy	0.066	0.13	0.19	0.09	0.058	0.12	0.091	0.067	0.05	0.044	0.015- 0.129
Screened gravel LM	cy	6.65	5.53	4.08	3.46	4.35	5.16	5.06	5.41	5.21	5.16	3.70- 5.18
Broken stone, LM	cy	4.38	5.21	5.36	5.24	6.73	6.47	5.27	5.00	5.91	5.97	4.06- 7.65
Resetting old curb	lf	2.42	2.75	3.47	2.53	2.40	3.23	2.02	2.89	2.62	3.62	2.00- 3.72
Conc curb, tp C	lf	1.50	1.78	1.87	1.97	2.80	2.48	1.51	1.75n	1.99	1.59s	1.37s- 6.00s
Reflecting conc curb, 9" Wx9" to 12" deep	lf	0.75	2.75	1.79	1.36	0.92	0.90	1.75	1.60	.....	1.38p	1.24p- 3.00p
conc mall, 4'0"WxO to 12½" deep	lf	3.07	3.57	3.33	3.50	3.50	5.00	3.50	4.00m	4.48	4.48	3.00- 5.31
Concrete gutters	sy	3.79	4.27	4.02	4.51	4.98	5.40	5.14	4.88	5.70	5.78	5.23- 6.95
Catch basins, MH & DI	cy	72.35	68.04	67.36	71.39	70.34	78.13	71.91	55.73	74.93	73.85	63.36-121.96
Altering MH & CB	ea	28.38	44.58	48.05	43.00	48.00	44.07	49.44	52.56	48.21	56.33	40.70- 92.04
Concrete ROW markers	ea	5.76	6.19	5.00	7.42	8.85	9.24	9.45	10.12	10.00	10.63	9.00- 11.55
sidewalk, 6"	sy	3.57	3.94	3.66	4.85	4.74	4.79	4.70	5.25	5.50	5.16	3.74- 7.00
Timber & lumber	Mfbm	231.89	212.66	160.04	191.85	221.81	237.00	232.23	331.00	289.00	283.18	185.71-354.40
stress graded	Mfbm	253.95	235.85	217.64	500.00	301.89	400.00	357.24	389.00	440.00	579.76	350.00-625.00
creosoted	Mfbm	265.07	268.02	317.27	400.00	332.06	493.29	506.51	344.00	478.00	446.69	400.00-500.00
Relaying old pipe	lf	1.75	1.97	1.90	2.02	2.23	2.57	2.14	2.41	3.24	2.68	1.91- 4.25
Pneu projected conc	sf of f	1.53	1.59	1.13	1.47	1.73	0.93	1.50	1.32	2.28	2.45	2.00- 2.71
Emuls carbon black	lb	0.012	0.106	0.098	0.120	0.138	0.134	0.111	0.084	0.10	0.11	0.103- 0.914
Highway RR barricade	lf	10.85	6.63	8.86	6.29	8.18	8.14	8.22	8.67	9.32	9.24	7.99- 13.00
Top crse bit mac opt asph cutback road mix	t	4.71	4.43	3.50	4.33	4.10	5.53	4.50	4.40	6.00	.....	......
Bit matl A cutback	gal	0.189	0.18	0.16	0.165	0.185	0.191	0.17	0.17	0.20	.....	......
ROB gravel fill	cy	2.22	2.34	2.11	1.94	2.35	2.58	2.95	2.00	3.65	3.13	2.77- 3.75
Reflect hwy-RR xing signs	ea	87.50	171.25	205.00	112.50	147.50	202.50	180.56	200.00	225.00	157.67	50.00-283.33
Top soil f&p	cy	1.90	2.37	2.86	3.38	3.73	4.16	3.29	2.71	2.91	3.69	1.50- 4.27
from stock piles p	cy	1.25	1.10	0.98	0.85	1.02	1.12	1.14	0.95	1.07	1.12	0.62- 2.34
Seed & seeding f&p	acre	246.45	229.55	286.84	325.41g	297.51	325.42	319.92	276.50	297.00	314.15	293.76-444.56
plus ground prep, fert & mulch	acre	489.35	353.40	234.87	368.74	612.91	.....	.....	329.28	352.00	700.00	300.00-800.00
Sod & sodding f	sy	1.37	1.50	1.27	1.18	1.27	1.45	1.55	1.45	1.32	1.35	0.87- 2.71
Mulch & mulching f	acre	142.23	230.07	158.24	65.69h	152.16	200.00	.....	187.18	191.00	166.90	100.00-169.69

•a Thruway $0.54–1952; $0.73–1953 •b Old standard, $2.41 new standard •c new, lighter & cheaper types of trans jt supports allowed in 1953 •d Lin ft of joint •e incl 1 contract of 39,100 cy at $9.47 per cy •f Incl 6 contracts ranging in price from $50 to $90 per cy •g Incl 1 contract of 100 acres at $295 per acre •h Incl 1 contract of 100 acres at $55 per acre •i Mostly I-beams $0.148, mostly plate girders or trusses $0.195 •j Averages for individual Districts •k 3/16" shell •m 4' W x 1'1" D, top white cement, exc cmt, reinf not incl •n unmounted •p type ABR •r dowel type •s conc curb, general

Three Road Jobs Pull Many Bidders

Mississippi offers contractors a variety of alternates

Mid-State Paving Co., Meridian, Miss., took three federal aid projects let by the State Highway Department of Mississippi. The awards total $1,032,895, 15.5% below the engineers' estimate.

On all three jobs, all bidders chose to bid on the reinforced concrete pipe alternate, placing no bids on extra strength vitrified clay pipe.

Liquidated damages for failure to meet completion schedules are limited to actual engineering and inspection salaries and expenses.

A $564,326 contract is for grading, draining and culverts on 10.957 miles of roadway and 0.009 miles of bridges, a total of 10.966 miles, an average of $51,461 a mile, on U.S. Highway 49 between Gulfport and Wiggins. Roadway surface is earth, varying in width between 42 and 108 ft.

Minimum wages on this job include: carpenters, $2.00; cement finishers, $2.05; bulldozer operators, $1.50-$1.75; tractor operators, $1.25; truck drivers, $1.25; common laborers, $1.00.

The fifteen bids on the Gulfport-Wiggins job went like this:

1C	Mid-State Paving Co., Meridian, Miss	$564,326
2	DuBose Constr. Co., Montgomery, Ala	580,389
15	Delta Constr. Co. of Jackson, Miss	752,372
EE	State Highway Dept. of Mississippi, Jackson	655,138

Bids: 2-25-58 Items	Unit	Quantity	Unit Prices 1C	 2
Clear & grub	ls	job	$25,000	$58,760
random	ac	5	100.00	150.00
Excavation, uncl, FM	cy	803,526	0.25	0.26
h	stay	6,567,000	0.003	0.003
muck	cy	108,739	0.65	0.45
structural	cy	1,808	2.00	3.00
Sel matl, cy½ mi units h	u	421,059	0.06	0.05
Roadbed topping, OPM	cy	145,068	0.30	0.26
Grav surf crse, clay LVM	cy	1,935	1.50	2.20
Conc, cl B, bridge	cy	384	50.00	50.00
	cy	829	60.00	55.00
arch pipe culv, 28⅞x19¾	lf	36	10.00	10.00
Steel, reinforcing	lb	153,161	0.14	0.14
Conc riprap in bags	cy	67	40.00	37.50
RCP culvert, 15"	lf	416	3.25	3.60
18"	lf	1,536	4.00	4.50
24"	lf	628	5.50	6.50
30"	lf	1,048	7.50	9.00
36"	lf	652	10.00	11.50
42"	lf	500	14.00	14.70
48"	lf	304	16.00	18.00
54"	lf	104	20.00	22.50
60"	lf	252	25.00	27.00
30" ext str	lf	124	9.00	10.25
60" ext str	lf	124	29.00	31.00
flared end, 18"	ea	1	50.00	40.00
Gratings	lb	1,013	0.50	0.50
Rt or way markers, type 1	ea	138	6.00	5.00
Agricultural limestone	t	152	25.00	30.00
Super phosphate	t	76	60.00	60.00
Sprigging	sy	366,160	0.05	0.05
Sodding, solid	sy	1,000	0.50	0.60

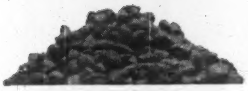
Completion schedule: 250 working days h—haul

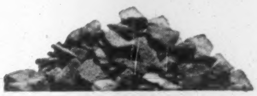
A second contract in the amount of $180,376, an average of $17,615 a mile, is for 10.24 miles of base and double

Name Your "Hard to Coat" Aggregate

CALIFORNIA
MARBLE CHIPS

OHIO
REFERENCE GRAVEL


MARYLAND
REFERENCE GRAVEL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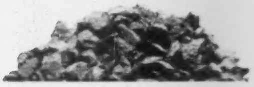
REFERENCE STONE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OREGON
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NEW *CATIONIC* BITUMULS

- **Treats Most Aggregate... Especially "Treacherous" Types Such As Shown Here**
- **Protects Your Cold-Mix Pavements and Surface Treatments Against Early Rains**

CATIONIC Bitumuls,® our new, cold-applied asphalt emulsion, is a truly versatile binder with a "native" affinity for all aggregate, even damp, slick, "hard to coat" gravel and other hydrophilic stone. It also sets more rapidly than conventional road emulsions.

This combination of properties offers definite advantages to the Roadbuilder:

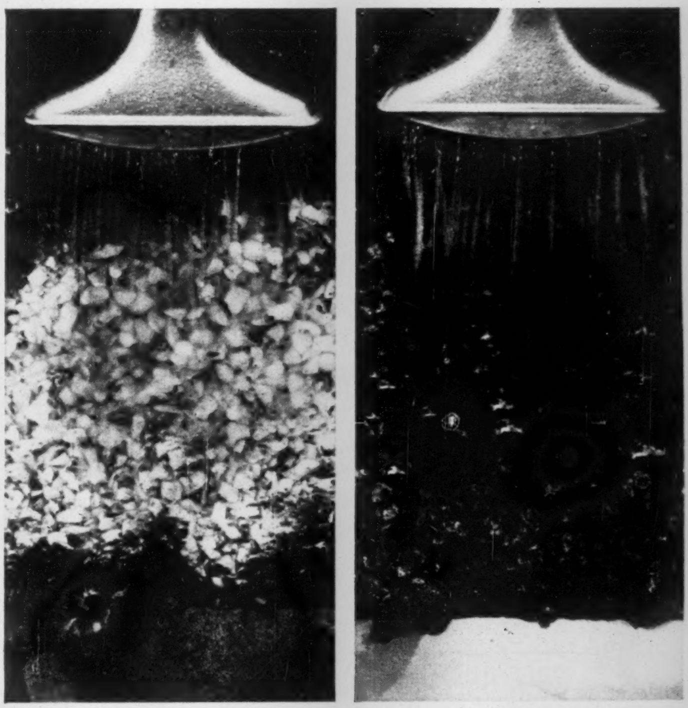
Wider selection in the use of local, often lower-cost, aggregates.

Extended working season . . . better protection against sudden showers.

Faster set permits early rolling of coarse aggregate mixes, and fast opening of pavement to traffic.

Storage, handling and application are much the same with CATIONIC Bitumuls as with conventional emulsions; however, care must be exercised in the preparation of storage facilities and application equipment.

CATIONIC Bitumuls is available from certain of our strategically located plants. Our engineers are ready to discuss projects which you may wish to set up for trials of this new product with specific types of aggregate.



Proof... the superior coating and holding properties of new CATIONIC Bitumuls are clearly demonstrated in this test. Note the almost-complete wash-out of the conventional road binder (left); while CATIONIC Bitumuls (right) firmly holds the crystal-silica chips used for these test mix samples.

American Bitumuls & Asphalt Company
320 Market, San Francisco 20, Calif. Perth Amboy, N. J.
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FOR: AIR APPLIED
MORTAR

Sigunit makes air-applied mortar rapid-setting and water resistant. Sigunit is well suited for work on tunnel linings, sea walls and spillways as it adheres to damp and leaking concrete surfaces. Water and rising tides will not wash out or cause structural weakness at the waterline.

Sigunit saves time and money by helping maintain your job schedule. For complete information, write or wire for Bulletin SIG-56.

Ad. No. 26-8

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. . . Mississippi road jobs

bituminous treatment on Mississippi Highway 13, between Maxie and Lumberton. Roadway width is 30 ft, surfacing 22 ft by ¾ in.

Bids were solicited on alternate asphalt for the prime coat. Cut back was favored over emulsified on all the bids. Stone seal aggregate took the bid away from the slag alternate, and no bids were submitted on a crushed gravel alternate.

Minimum wages on this job include: carpenters, $2.00; cement finishers, $2.25; asphalt spreaders, $1.50; bulldozer operators, $1.80; common laborers, $1.00.

The eight bids on this job included:

1C	Mid-State Paving Co., Meridian, Miss	$180,376
2	W. E. Blain & Son, Mt. Olive, Miss	195,072
8	M. C. Farmer, Mobile, Ala	244,976
EE	State Highway Dept. of Mississippi, Jackson	249,900

Bids: 2-25-58 Items	Unit	Quantity	Unit Prices 1C	 2
Exc, uncl, FM	cy	1,000	$0.50	$0.60
spec, cy—½ mi units h	u	4,000	0.06	0.05
Grav base crse, clay, LVM	cy	72,751	1.48	1.88
Asph for prime ct—cut back	gal	54,166	0.15	0.16
surf treatment	gal	106,916	0.14	0.15
Cover aggr, tp I	cy	2,745	10.66	
alt tp IV, uncrushed	cy	2,745		6.65
Seal aggr, stone tp VI	cy	1,478	10.66	
alt slag, tp VI	cy	1,478		6.75
RCP culvert, 18"	lf	20	4.00	5.00
flared end pipe culv, 18"	ea	1	45.00	25.00
Conc curb, header	lf	1,130	1.25	2.10
Agricultural limestone	t	10	25.00	30.00
Super phosphate	t	5	60.00	65.00
Sprigging	sy	24,042	0.05	0.06

Completion schedule: 100 working days

A third contract for $288,193, an average of $26,464 a mile, is for subgrade preparation, topping, base and double bituminous treatment of 10.89 miles on Mississippi Highway 25, between Carthage and Louisville. Roadway width is 32 ft, surfacing 22 ft x ¾ in.

Emulsified asphalt took the bid away from cut back on this one. Bids on alternate types of cover aggregate favored the uncrushed, type IV, on which the award was made.

No bids were received on alternate stone or crushed gravel seal aggregate. The bids were all on slag.

Minimum wages on this job include: asphalt spreaders, $1.50; bulldozer operators, $1.50-$2.00; common laborers, $1.00.

The nine bids included:

1C	Mid-State Paving Co., Meridian, Miss	$288,193
2	W. E. Blain & Sons, Mt. Olive, Miss	295,446
9	J. A. Hadley, Humboldt, Tenn	316,918
EE	State Highway Dept. of Mississippi	317,499

Bids: 2-25-58 Items	Unit	Quantity	Unit Prices 1C	 2
Clear & grub, random	ac	1	$100.00	$150.00
Exc, uncl, FM	cy	1,150	0.50	0.40
h	stay	24,000	0.01	0.00
spec, cy—½ mi unit h	u	1,150	0.06	0.01
stripping pits	cy	12,000	0.15	0.26
Sel mat, cy—½ mi unit h	u	621,918	0.05	0.00
Roadbed topping, OPM	cy	94,926	0.30	0.30
Subgrade prep, linear	mi	7.137	300.00	500.05
Mix, shape & compact	sy	171,595	0.11	0.10
Stab aggr, comm, coarse, LVM	cy	26,057	4.15	4.00
medium LVM	cy	4,343	4.00	4.00
Grav base crse, stab agg, LVM	cy	303	4.15	4.50
Asph prime coat, cut back	gal	59,934		0.17
emuls	gal	59,934	0.15	
cmt surface treatment	gal	118,868	0.14	0.16
Cover aggr, tp I	cy	3,053		
alt tp IV, uncrushed	cy	3,053	7.00	8.00
Seal aggr, tp VI, slag	cy	1,644	7.00	8.00
RCP culv, 15"	lf	72	4.00	3.10
18"	lf	24	6.00	4.20
Conc pipe sewer, 6"	lf	400	1.00	1.10
underdrain, perf, 6"	lf	1,650	2.50	2.25
Agricultural limestone	t	50	20.00	25.00
Super phosphate	t	25	60.00	60.00
Sprigging	sy	102,224	0.05	0.06
Solid sodding	sy	17,436	0.40	0.50

Completion schedule: 150 working days

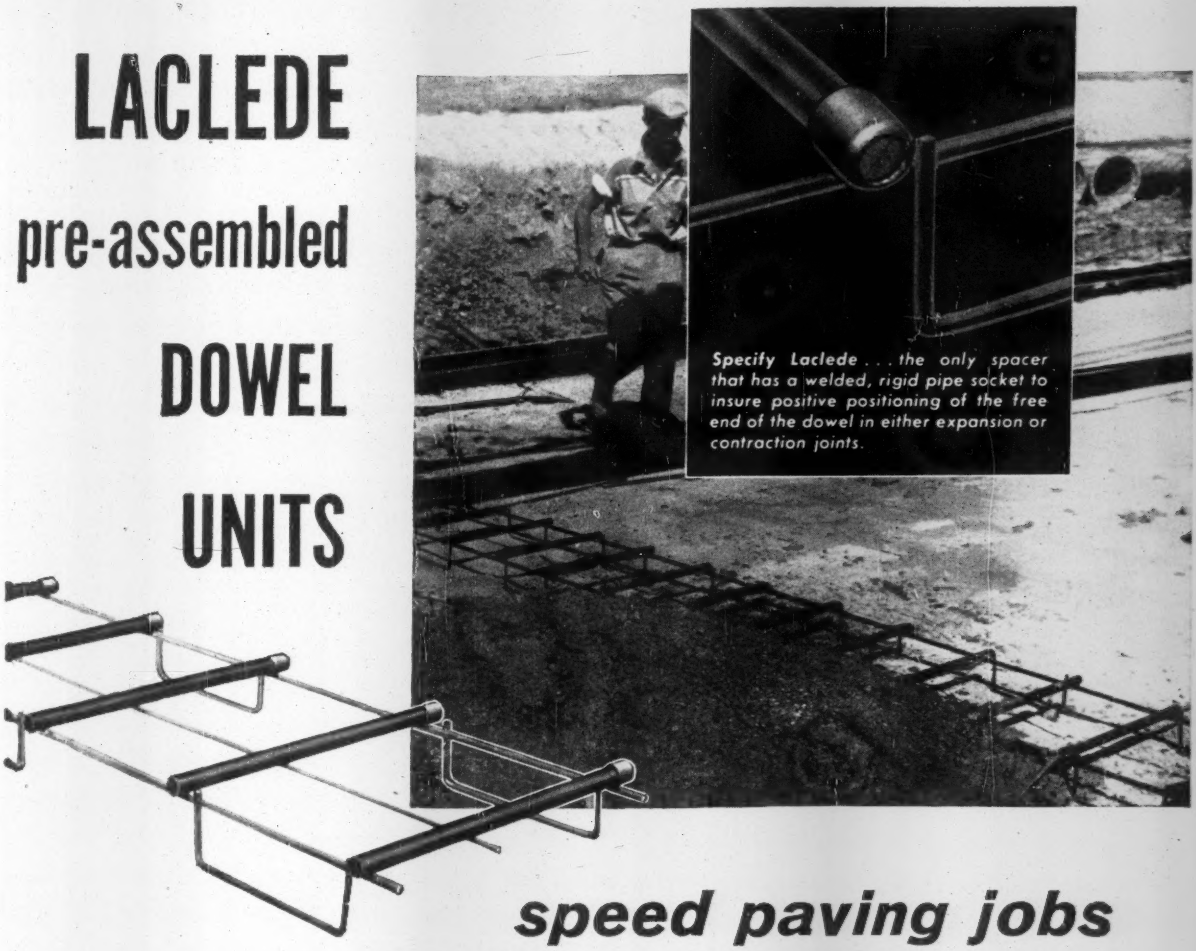
Bid Prices—State Highway Comm., Missouri 1950-1957

Eight year trends for selected items

Items	Unit	Average Low Unit Bid Prices 1950	 1951	 1952	 1953	 1954	 1955	 1956	 1957
Clearing	ac	$130.63	$161.18	$215.82	$233.99	$198.36	$179.33	$175.07	$199.54
	ac	95.72	124.39	179.76	130.00	117.94	139.93	115.92	139.43
Grubbing	ac	90.62	123.56	153.99	159.04	128.51	119.60	106.91	169.48
	ac	57.50	91.21	124.67	79.76	66.93	84.82	75.11	85.50
Excavation cl A	cy	0.31	0.37	0.47	0.42	0.28	0.33	0.35	0.42
cl A	cy	0.33	0.43	0.54	0.45	0.35	0.40	0.36	0.41
cl C	cy	1.06	1.22	0.95	1.26	1.19	0.90	1.15	1.40
cl C	cy	1.48	1.84	2.06	1.58	1.25	1.52	1.42	1.49
Machine grading cl 1	sta	20.94	26.47	36.44	27.65	25.29	29.84	27.35	30.20
cl 2	sta	29.09	37.18	47.79	36.85	34.50	39.78	34.50	38.35
Excavation, struct	cy	2.66	3.44	4.26	3.50	2.97	3.02	3.36	4.42
Compaction in cuts r	cy	0.08	0.08	0.18	0.06	0.08	0.03	0.06	0.13
Water 100	gal	0.45	0.46	....	0.50	....	0.50	0.46	0.43
Aggr roll stone base	t	2.36	2.89	2.41	1.85	2.09	1.90	2.34	2.04
spread, shape, compact	sy	0.32	0.44	0.54	0.41	0.42	0.45	0.39	0.51
stabilized	t	2.20	2.36	2.54	2.63	1.62	1.67	1.95	1.75
spread, shape, compact	sy	0.33	0.62	0.56	0.47	0.32	0.33	0.33	0.37
Conc base crse, 8"	sy	....		....					4.89
Granular base material	t	2.21	1.56	2.21	2.80	1.64	1.81	1.79	1.91
spread, shape, compact	sy	0.30	0.41	0.76	0.31	0.35	0.21	0.28	0.21
Primer	gal	0.17	0.24	0.21	0.16	0.20	0.15	0.20	0.19
sanding	t		....	....	4.60	4.39	4.76	5.36	5.43
Asphaltic concrete, type B	t	5.92	7.85	7.98	7.97	6.23	5.98	6.30	7.73
type C	t	6.45	7.82	8.21	8.44	6.75	6.60	6.85	8.42
Asphaltic wedge course	t	6.87	8.27	8.48	8.67	6.75	6.42	6.62	7.74
Bit matl, aggr h&w	cy	2.37	2.82	3.80	3.61	2.45	3.85	3.22	2.73
surf, process	mi	791.72	721.50	1098.66	1301.13	826.04	1102.50	1120.62	2601.60
primer (MC0)	gal	0.19	0.23		0.26	0.28	0.17	0.14	0.20
binder MC, 3 or 4	gal	0.11	0.13	0.12	0.14	0.10	0.11	0.14	0.21
seal coat	gal	....	....	0.13	....	....	0.16	0.21	0.19
Cover matl, seal coat	t		....	5.00			4.14	3.73	4.85
Bit matl, dble seal coat	gal	0.16	0.18	0.16	0.13	0.13	0.18	0.30	....
	t	5.00	5.14	4.50	4.88	3.67	3.78	5.96	....
Granular surfacing	cy	2.07	2.59	2.85	2.26	2.09	2.11	1.98	2.30
Pavement RPCC 8"	sy	3.69	3.85	4.42	4.06	3.89	4.14	4.53	4.70
Appr slabs, bridges	sy	....	....	....	7.00	13.68	14.16	14.54	16.78

(*Unit Prices continued on page 87*)

LACLEDE pre-assembled DOWEL UNITS



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- *multi-rib round reinforcing bars*
- *center joints*
- *tie bars*
- *7-wire strand for prestressing*
- *welded wire fabric*
- *recess joints*
- *accessories*

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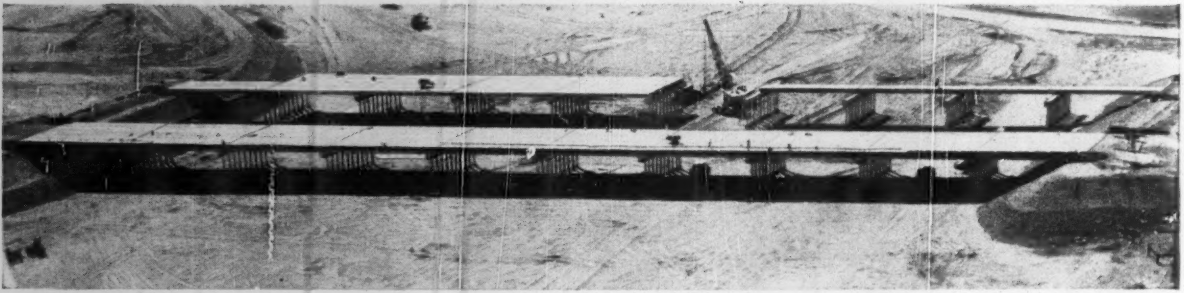
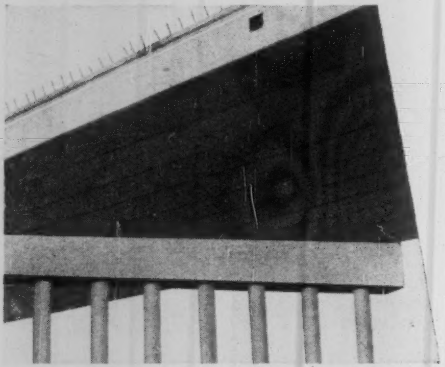


Dual lane highway bridges, constructed with prestressed pretensioned Amdek Beams, near completion in Socorro County, New Mexico. Erected for the New Mexico State Highway Department as part of the Federal Interstate Program.



Low depth-to-span ratio means less weight, greater clearance and reduced fill. Smooth underdeck offers minimum resistance to flood debris.

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Progress in Concrete

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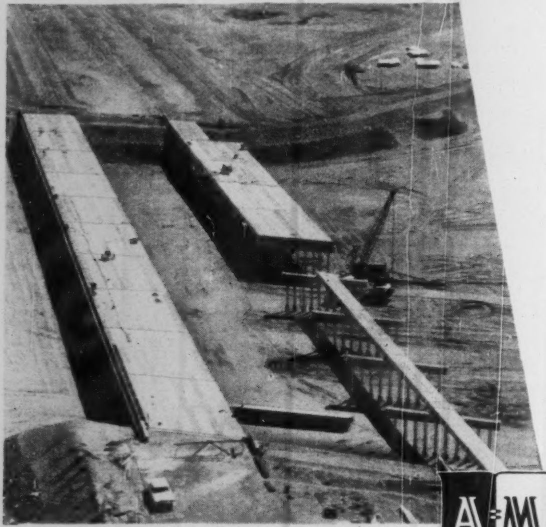
Precast Amdek is rapidly placed in any weather and assures a bridge of beauty for years without painting or other maintenance. Materials are readily available . . . plants are strategically located for fast delivery anywhere—to bring you "Tomorrow's Bridge" today.

American-Marietta's experts in the design and manufacture of prestressed and precast concrete bridge members—including Amdek, I-Beams and Channel Slabs—can help *you* save considerable time and money.



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. . . Highway Price Trends—Missouri

Item	Unit	Average Low Unit Bid Prices 1950	1951	1952	1953	1954	1955	1956	1957
Conc cl B box culv	cy	48.18	55.50	66.78	64.20	55.85	62.94	54.03	62.42
other than boxes	cy	79.96	92.05	113.34	111.16	103.10	74.75	115.47	132.53
Culvert CMP 15"	lf	2.50	2.93	3.10	3.01	2.77	3.08	2.93	3.09
24"	lf	4.55	5.02	5.17	4.95	4.72	5.18	5.23	5.56
36"	lf	8.49	9.38	10.35	9.33	9.18	9.55	9.54	10.73
48"	lf	11.20	12.99	14.21	12.86	12.91	13.64	13.73	14.30
RCP 15"	lf	2.90	3.28	4.47	3.55	3.54	3.86	4.27	4.55
24"	lf	5.15	5.78	5.81	6.00	5.54	6.44	6.39	7.19
36"	lf	10.05	10.95	12.61	10.13	9.10	10.98	11.11	12.11
48"	lf	14.00	17.35	16.44	16.00	15.32	19.61	15.21	19.19
metal arch type B1	lf	2.69	3.50	4.90	3.54	3.13	3.19	3.10	4.36
B3	lf	4.60	5.29	5.69	5.12	5.10	5.54	5.60	5.87
B5	lf	8.89	10.06	10.44	9.82	9.80	10.64	10.60	11.37
B8	lf	16.11	18.31	20.23	18.69	18.58	19.22	19.08	19.60
relaid pipe	lf	2.04	2.85	3.56	3.22	2.23	2.86	2.72	3.19
Steel reinf	lb	0.11	0.13	0.15	0.15	0.13	0.14	0.14	0.16
Guard rail	lf	2.55	2.62	2.56	2.74	2.57	3.68	3.33	3.22
Fertilize & mulch	ac	167.72	190.96	225.92	218.03	191.22	199.10	197.39	209.52
Sodding	sy	0.49	0.54	0.67	0.63	0.67	0.55	0.60	0.68

Bridge & Structure

Item	Unit	1950	1951	1952	1953	1954	1955	1956	1957
Excavation, struct cl 1	cy	6.12	6.87	10.37	11.71	6.55	7.44	7.62	9.44
cl 2	cy	15.33	20.24	27.21	22.27	20.55	22.71	20.37	22.90
cl 3	cy	2.55	3.85	5.37	3.77	2.78	3.21	3.20	3.62
Concrete cl B	cy	47.23	54.23	65.49	61.05	51.15	54.30	54.04	61.12
substructure	cy	55.30	65.15	66.07	68.47	64.67	59.10	64.25	66.42
superstructure	cy	57.46	66.25	76.23	68.62	62.85	65.19	82.82	71.80
hand rail	cy	117.77	122.29	130.81	119.32	115.99	102.13	137.31	....
Steel fab struct, I beams	lb	0.13	0.16	0.15	0.16	0.15	0.16	0.18	0.21
truss spans	lb	0.22	0.24	0.21	0.24	0.18	0.26	0.25	
bearing plates	lb	0.75	0.89	0.91	0.78	0.76	0.69	0.77	0.65
Gray iron alloy castings	lb	0.73	0.97	0.79	0.95	0.85	0.90	0.96	0.98
Steel reinf	lb	0.11	0.13	0.14	0.15	0.13	0.14	0.15	0.16
Piles treated timber	lf	3.12	3.70	4.34	3.75	3.77	3.90	3.73	3.99
concrete	lf	6.96	6.09	11.32	8.68	7.61	6.95	8.47	9.78
steel	lf	5.29	7.03	8.59	6.31	5.94	5.59	6.97	7.63
Guard rail	lf	....	....	....	....	....	....	....	4.38

a—for 6" base 8" base $0.39 h&w—haul & windrow r—rolling

Highway Price Trends in Florida

Average unit prices on selected items, by quarters, 1957 and 1958

Items	Unit	Unit Prices 1957 1st quar.	2nd quar.	3rd quar.	4th quar.	Yearly avg.	Unit Price 1958 1st quar.
Excavation, regular	cy	$0.366	$0.373	$0.320	$0.380	$0.364	
borrow	cy	0.484	0.532	0.510	0.423	0.477	$0.46
ditch	cy	0.431	0.658			0.549	
subsoil	cy	0.505	0.549	0.577	0.435	0.504	0.48
grading	cy	0.445	0.515	0.496	0.385	0.454	0.32
miscellaneous	cy						0.90
Embankment	cy	0.694	1.213		1.012	0.906	0.70
Stabilizing	sy						0.16
Base, limerock, 8½" primed	sy	1.431	1.818	1.781	1.406	1.574	1.49
6½" primed	sy	1.304	1.352	1.467	1.112	1.306	1.12
sand-clay base, 6½" primed	sy	0.447	0.728	0.519	0.397	0.523	0.41
limerock matl for stab	cy	3.856	3.462	3.631	3.715	3.653	2.47
stab base, primed	sy	0.201	0.223	0.224	0.203	0.213	0.15a
shell matl	cy	4.59	5.955	4.78	4.701	4.967	5.63
stab	sy	0.23	0.339	0.26	0.270	0.278	0.28
Bit matl, plant mix	gal	0.139	0.153	0.142	0.135	0.141	0.128
surf treat	gal	0.176	0.173	0.177	0.160	0.170	0.167
cutback asphalt	gal	0.132	0.204	0.151		0.145	0.144
Cover material	cy	8.786	8.891	8.214	7.757	8.354	7.18
Surf crse, asph conc, w binder	sy	0.841	0.900	1.067	1.147	0.963	0.94
sand asph, hot mix	t	4.413	4.67	3.868	4.015	4.157	3.50
asph conc, type 1	t	6.143	7.76	6.900	7.022	6.806	6.63
type 2	t	5.920	7.11	6.350	6.596	6.334	5.24
Concrete, bridge	cy	63.03	62.36	59.99	57.159	61.404	60.52
culvert	cy	64.94	68.28	74.82	59.355	61.273	59.20b
walls and misc	cy	70.98	66.71	56.01			
Concrete paving, plain, 8"	sy	5.85	3.88			4.011	4.95
7"	sy	4.242	5.60		5.500	5.256	5.28
9"	sy				4.630	4.630	4.31
9" reinf.	sy	10.464	10.489			10.488	10.27
Steel, reinforcing	lb	0.137	0.135	0.133	0.127	0.133	0.122
structural	lb	0.414	0.208	0.242	0.218	0.224	
Concrete pipe, 24"	lf	7.63	8.18	7.77	7.13	7.787	7.14
36"	lf	14.79	15.85	14.58	15.50	15.297	13.42
Corr. metal pipe, 18"	lf	5.23	4.78	4.59	4.332	4.626	4.27
24"	lf	6.02	6.52	6.95	6.117	6.55	5.92
Piling, timber	lf	3.86	2.90	3.46	2.82	3.091	
precast concrete, 12" sq	lf	6.25	7.63	7.26	7.23	7.195	6.65
14" sq	lf	6.88	8.15	8.81	7.01	7.448	6.00
18" sq	lf	8.80	9.44	10.24	9.43	9.50	9.12
Grassing & mulching	sy	0.043	0.0475	0.044	0.037	0.0421	0.033
Grassing	sy	0.034	0.036	0.035	0.027	0.0331	0.027
Mulch material	t	42.70	45.78	46.07	39.63	43.064	
Concrete handrail	lf	6.22	4.204	5.88	6.507	5.776	5.63
Sand cement riprap	cy	34.84	35.38	38.47	34.13	35.369	34.37
Concrete ditch pavement, 3"	sy	3.72	3.90	3.50	3.276	3.537	3.11
curb, median	lf	1.68	1.76	2.00	1.65	1.743	1.67
curb & gutter	lf	1.72	1.87	1.95	1.71	1.812	1.70
sidewalk, 4"	sy	3.55	3.98	3.93	3.978	3.892	3.30
6"	sy	4.93	4.86	5.27	4.336	4.912	....
Metal guard rail	lf	3.295	3.03	3.37	2.914	3.094	2.90
Inlets	ea	312.13	323.63	336.13	296.00	317.81	332.88
Traffic separators, 4' wide	ea	4.20	3.69	3.82	3.40	3.76	4.36
Prestressed conc beams, type 2	lf	......	......	......	......	......	11.09
type 3	lf	......	......	......	......	......	14.03
slabs, 10" thick	sf	......	......	......	......	......	3.26

a—not primed b—culverts & misc

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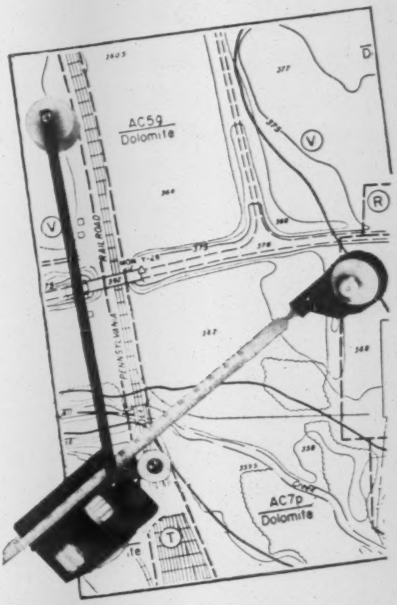

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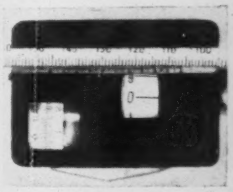

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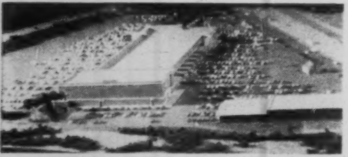
GRANVILLE ST. BRIDGE, VANCOUVER, BRITISH COLUMBIA—One of the largest 8 lane bridges in North America. Here Weld-Crete was applied to bridge surface to bond cement dividing strips. Now, over 4 years later, bonds are as good as new. *General Contractor:* Dominion Bridge Company.



SEVEN CORNERS SHOPPING CENTER, FALLS CHURCH, VIRGINIA—During construction of this 600,000 sq. ft. structure, initially only part of floor was poured and floated to a smooth finish. Areas in which show windows would be added were poured as base slab only. Slab was coated with Weld-Crete. After store fronts were custom-built, delayed toppings of 1" to 1½" thick were poured with assurance of permanent bond to base slab. These toppings were then finished with asphalt tile, wood, or finish flooring of lessee's choice. Designed and constructed by The Kass Realty Co. of the Kass-Berger Organization under direction of J. Franklin Groff. *Concrete Contractor:* Moses-Ekco.

Bridge and Railroad Overpasses, Alabama

This 0.479 mile Alabama State Highway project in Decatur, Limestone and Montgomery Counties, Ala., includes a bridge over the Tennessee River and railroad overpasses. The $1,133,581 award to Blount Bros. Construction Co., Montgomery, Ala., is 4.7% below the second and almost 24% below the high of five bids.

Ten cofferdams for pier construction range in cost from $28,000 to $40,000, including pumping.

Underwater excavation is in about 35 ft of water.

The contractor furnishes all materials except steel pile splices.

Minimum wages on the job include: tractor operators, $2.55; shovel and crane operators, $2.925; concrete finishers, $2.50; unskilled laborers, $1.70.

1C	Blount Bros. Constr. Co., Montgomery, Ala	$1,133,581
2	Hardaway Contr. Co., Columbus, Ga	1,189,199
5	Massman Constr. Co., Kansas City, Mo	1,488,305

Bids: 4-11-58 Items	Unit	Quantity	Unit Prices 1C	 2
Bridge excavation, cl 1	cy	341	$10.00	$2.00
2	cy	2,460	42.00	23.00
Cofferdam & pumping,				
pier 13	ls	job	34,000	14,000
14	ls	job	34,000	14,000
15	ls	job	40,000	14,000
16	ls	job	40,000	14,000
17	ls	job	40,000	14,000
18	ls	job	40,000	14,000
19	ls	job	28,000	14,000
20	ls	job	28,000	14,000
21	ls	job	28,000	14,000
22	ls	job	28,000	14,000
Conc, cl A, bridge				
RCDG & cont span	cy	1,378	67.00	75.00
abutment, piers & bents	cy	282	58.00	75.00
piers, 13 thru 22	cy	2,175	47.00	65.00
Seal concrete	cy	1,960	35.00	35.00
Loading test	ea	4	250.00	1,500
Steel pile splices	ea	25	16.00	25.00
10" at 42, St furn	lf	3,870	1.20	2.00
reinforcement	lb	851,220	0.11	0.15
structural	lb	76,310	0.26	0.40
Superstructure, excl conc				
136' cont span	ls	job	124,000	195,350
140' cont span	ls	job	160,000	282,040
Ladders, piers 14-22 ff&e	ls	job	2,000	5,000
Self-lubrctng brnz brng plates	set	1	1,500	1,500
Bri progress photos, tp 1	ls	job	325.00	1,000

ff&e furn, fabricate & erect

Commence: 6-1-58 Complete Aug. 1, 1960
Liquidated damages: $75 day

Highway Prices, Kentucky

Average unit prices on selected items

Item	Unit	1956a	1957b
Aggr, dense grade base	t	$3.27	$3.297
grav, bank or creek	t	1.00	0.993
river gravel	t	2.00	2.560c
cr limestn, insul & base	t	3.36	3.588
rdwy & entr	t	2.84	2.887
cr slag, rdwy	t	4.97	5.00c
Bit conc, cl I, base	t	6.55	6.910
binder	t	6.56	6.809
leveling	t	7.01	7.357
surface	t	7.25	7.271
mach patch	t	7.34	7.782
cl I or H, bri floor	sf	0.463	......
	t	......	18.348
Bit matl, mix	gal	0.146d	0.155e
prime & tack	gal	0.155d	0.159f
Calcium chloride	t	60.22	65.010
Catch basins, ditch	ea	115.00	173.214
capping	ea	28.61	25.000
remove	ea	22.62	35.277
Clear & grub	acre	77.51	94.567
Concrete, cl A	cy	56.16h	55.691
cl B	cy	51.56	52.902g
cl D	cy	182.10	195.582
modified	cy	......	114.664
Curb, integral	lf	0.49	0.719i
lip	lf	0.54	0.50j
island	lf	1.50	1.328
& gutter, conc	lf	3.09	3.262
Ditch, surf., 1 sf area	lf	0.15	0.069
2 sf area	lf	0.25	0.173
& shoulder	mi	378.94	498.873
Excavation, borrow	cy	0.60	0.702
roadway	cy	0.51	0.455
struct, common	cy	4.15	5.876
solid rock	cy	11.70	12.616
unclass	cy	4.42	3.622
Fence, chain link	lf	5.00	2.60
Fertilizer, comm, 12-12-12	t	94.00	98.365
Final dressing 100'	sta	17.80	19.548
Flooring, metal, bridges	sf	1.92	2.169
Flume, concrete	lf	4.73	5.172
inlet	ea	300.00	207.222
Guard rail, beam type	lf	3.32	3.174
posts	ea	4.52	4.613
Cutter, valley	sy	4.27i	7.565
Handrail, aluminum	lf	13.00	......
pipe	lf	......	7.960
galv iron pipe	lf	5.76	3.205
Headwall, remove	ea	7.13	8.257
Inlets, curb & gutter, 12"	ea	265.00	268.369
15"	ea	272.22	311.574
18"	ea	290.37	380.666
24"	ea	345.00	371.875
valley gutter, 24"	ea	175.00	275.000
Junction box	ea	300.00	225.000
Limestone, agricultural	t	7.22	8.190
Manholes	ea	332.00	312.045
Masonry, wet stone	cy	81.00	24.75
dry stone	cy	40.00	......
Conc median strip, 2'	lf	1.60	2.80
4'	lf	2.40	4.151
Bit conc median strip	lf	2.62	2.376
Overhaul y	sta	0.01	0.016
Pavement, cmt conc, base	sy	5.25	4.514
entr	sy	5.52	6.663k
Piling, conc, 14" f	lf	4.50	4.813
14" dr	lf	3.51	4.412
16" f	lf	4.86	5.75
16" dr	lf	4.41	5.337
steel, 12" f	lf	5.76	4.307
12" dr	lf	4.64	3.338
Pipe culv, BCCM, 18"	lf	4.13	4.028
24"	lf	6.02	5.974
30"	lf	8.05	7.872
36"	lf	10.64	10.688
42"	lf	12.68	13.744
RC, 12"	lf	2.38	2.985
15"	lf	2.92	3.219
18"	lf	3.73	4.024
24"	lf	5.61	6.258
30"	lf	8.21	8.070
36"	lf	10.41	11.330
42"	lf	12.81	14.333
48"	lf	16.07	17.343
54"	lf	20.65	20.030
RC, ext str, 24"	lf	6.50	6.797
36"	lf	12.75	13.720
42"	lf	16.34	15.592
Pipe entrance, CM, 15"	lf	2.95	3.144
18"	lf	3.81	3.737
24"	lf	5.20	5.583
30"	lf	7.21	5.599
RC, 15"	lf	3.36	3.219
18"	lf	3.78	3.985
24"	lf	5.22	5.904
36"	lf	10.00	11.270
42"	lf	14.00	14.222
48"	lf	18.00	24.981
Pipe arch, CM, 18"x11"	lf	4.82	5.48
22"x13"	lf	5.10	5.55
29"x18"	lf	7.43	7.79
36"x22"	lf	9.00	9.00
43"x27"	lf	11.08	14.66
50"x31"	lf	17.57	17.75
58"x36"	lf	20.00	19.12
65"x40"	lf	25.04	22.72
72"x44"	lf	28.02	28.83
Plate arch, 6'5"x4'10"	lf	36.55	......
6'10"x5'0"	lf	......	37.00
Pipe, remove	lf	0.98	1.21
relay	lf	1.10	1.29
Plates, bronze, expansion	lb	1.21	1.20
Project monument	ea	35.84	36.25
Reshape & compact	sta	11.49	12.87
Rt of way markers	ea	7.49	7.575
Riprap	sy	4.00	2.720
Rock asphalt	t	15.93	14.61
Seed & protect, uncl	sy	0.124	......
Conc sidewalk, 4"	sy	3.78	4.156
remove	sy	1.09	0.643
Slope protection	sy	5.61	5.70
Sodding	sy	1.03	0.74
Steel, structural	lb	0.227	0.312
reinforcing	lb	0.133	0.138
Tar, RT-2, prime	gal	0.227	0.241
Trees or stumps, remove	ea	60.84	73.71
Water	Mgal	......	1.31

•a Principal items on projects other than RS •b Avg bid on major items by successful bidders •c Traffic bound •d Unclassified •e ME-4, mix & seal •f MC-4 •g Retaining walls •h structural •i Concrete •j Bituminous •k 6"

1949/51 prices, ENR 4-3-52 1952 prices, ENR 4-2-53
1953/54 prices, ENR 3-24-55 1954/55 prices, ENR 2-9-56

(*Unit Prices continued on page 90*)

another big step ahead... the Blaw-Knox EXPRESS Paver

Here is the newest model of the world's most advanced Bituminous Paver. It is designed to bring contractors all over America bigger profits through improved, more automatic operation.

Better Finishing

New one-piece screed of abrasion-resistant alloy steel provides smoother finishing. Brand new screed extensions install faster. Big cam-type adjustment bolts eliminate shimming, give you a true line surface up to sixteen feet. Two screed heaters are standard on the Express Paver for faster heat-up, more even heat distribution. Positive and negative crowns adjustments are made from a turn buckle-type adjustment nut above the screed. Planing adjustment point is located *at the screed.*

Better Tamping

An entirely new tamping system has been incorporated for easier operation, greater compaction and density. Single tamper drive is easier to service, removes synchronization problems. Tamper frames are welded from heavy steel angle. Tamper shoes are one inch thick high alloy steel plate with a ¾-inch horizontal compaction surface. Tamper shield design eliminates bridging by giving a rolling action to the material.

Better Spreading

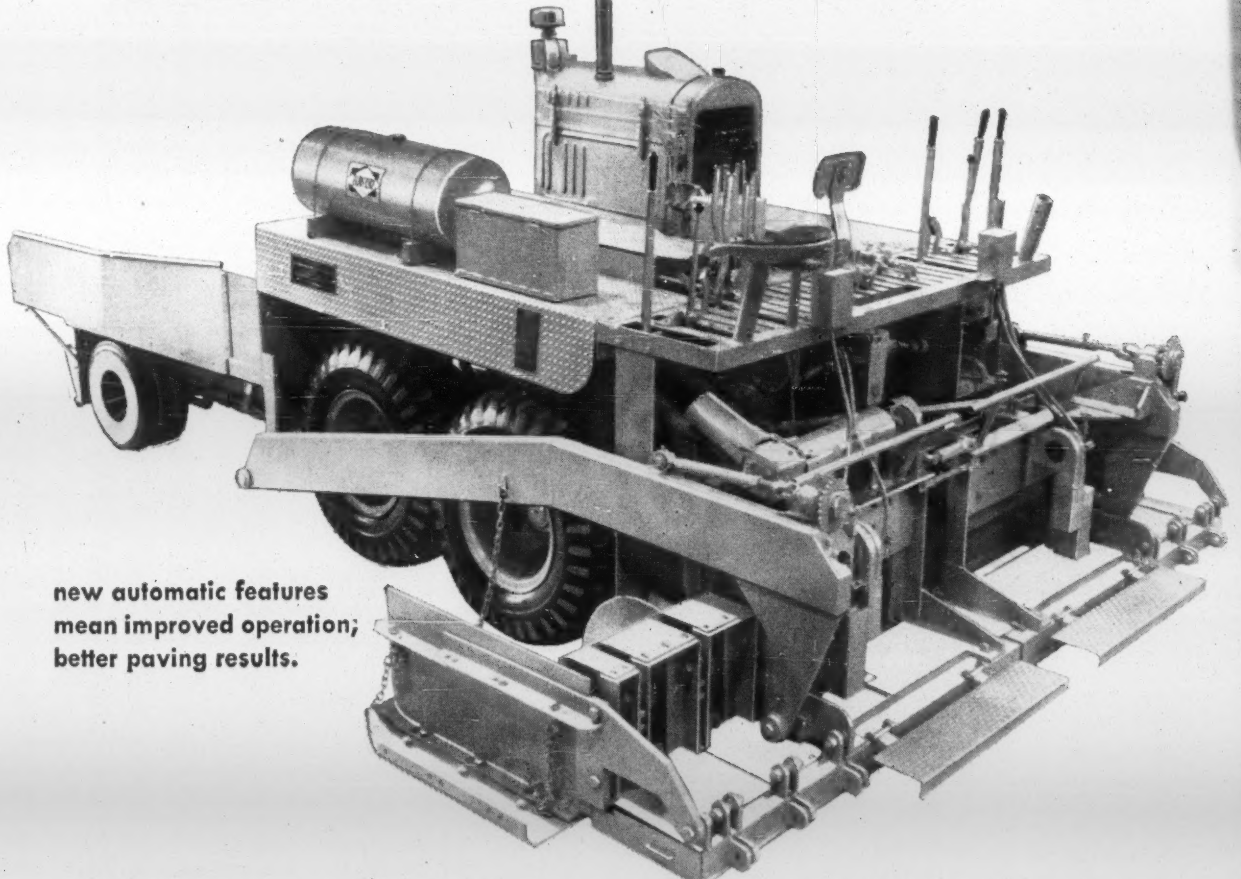
New Augers on the Express Paver are tapered toward center for better distribution of the mix. Auger faces are abrasion-resistant for longer wear. New hangers support the augers and are equipped with sealed anti-friction bearings.

Air Controls

For a small additional investment you can specify the new air control package for more automatic operation of material feed, traction clutch and brakes. Material feed control automatically shuts off conveyor and augers when proper level of mix is reached.

The new traction air clutch provides smoother starting, no clutch adjustment and hydraulic braking is easier with air actuation. Air system is operated from a convenient finger-tip panel which is quickly moved to either side of the machine.

Get full season benefits from this new, improved, machine. Your Blaw-Knox distributor has all the information. Call him today!



new automatic features mean improved operation; better paving results.

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Construction Equipment Division
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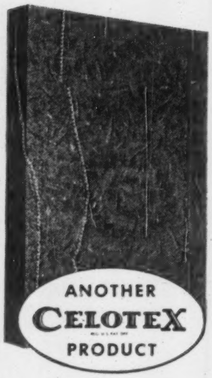
Does the job best!

"We always use Flexcell. We like the way it works, the way it wears," says W. E. Riggin, chief project engineer for Lipsett Construction Company. Shown at the Vine Street Extension, a major link in the new Philadelphia Expressway system, Mr. Riggin is here supervising work on the project, which includes seven bridges crossing the expressway.

Flexcell bituminous impregnated fiber board bonds firmly to concrete, compresses without extruding. Re-expands to keep joints filled, preventing intrusion of dirt and stones. Uniform asphalt impregnation, 35% by weight minimum. Unaffected by temperature extremes. Tough, rigid, light in weight. Easy to cut and install. Fabricated to your specifications.



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New Jersey Highway Prices

1957 weighted average contract unit prices, selected items

	Unit	Avg Price
Exc, incl disp matl, roadway, earth	cy	$0.53
rock	cy	2.23
unclass	cy	0.77
wet	cy	0.92
channel	cy	1.12
ditch	cy	1.33
borrow, incl place & compact	cy	0.94
Subbase, incl place & compact	cy	2.17
Gravel shoulders, 6"	sy	1.56
Topsoil, 4", incl placement & seeding	sy	0.38
Mulch	sy	0.05
Riprap slope protection	sy	10.32
Base crse macadam, 7", incl place & compact	sy	1.71
concrete, 8"	sy	5.28
Intercourse, pen macadam, 3"	sy	0.92d
Pavement, tp MABC-2, 3" thick	sy	1.59c
conc, 8", excl exp jts	sy	6.98
9" reinf, excl exp jts	sy	6.35
Conc, cl C, walls, steps, etc, incl forms	cy	95.00
pipe, culv, 8"	lf	3.00a
RCP, culv, std str, 18"	lf	5.88a
36"	lf	14.52a
ext str, 60"	lf	30.00a
Cl culv pipe, ext heavy, 12"	lf	8.47a
18"	lf	16.07a
CM pipe, perf, 6"	lf	2.93a
culvert, 12"	lf	5.49a
24"	lf	10.29a
72"	lf	40.00a
22 x 13"	lf	6.82
Manhole, incl heads	ea	293.00
Inlets, type E	ea	278.00
Conc gutter & aprons, 6"	sy	6.79
white, vert curb, 9 x 17 aver	lf	2.58b
Barrier curb, 30 x 18"	lf	5.73b
Conc sidewalk, 4"	sy	4.71
Headwalls	cy	96.00
Guard rail, std beam, incl painting	lf	3.30

$$\frac{\text{unit x price}}{\text{total units}} = \text{wgted avg price}$$

•a All pipe items incl exc of trenches & backfill •b incl exc & forms •c N.J. std bit conc, incl placement and compaction •d excl bit binder matl.

Vermont Highway Prices

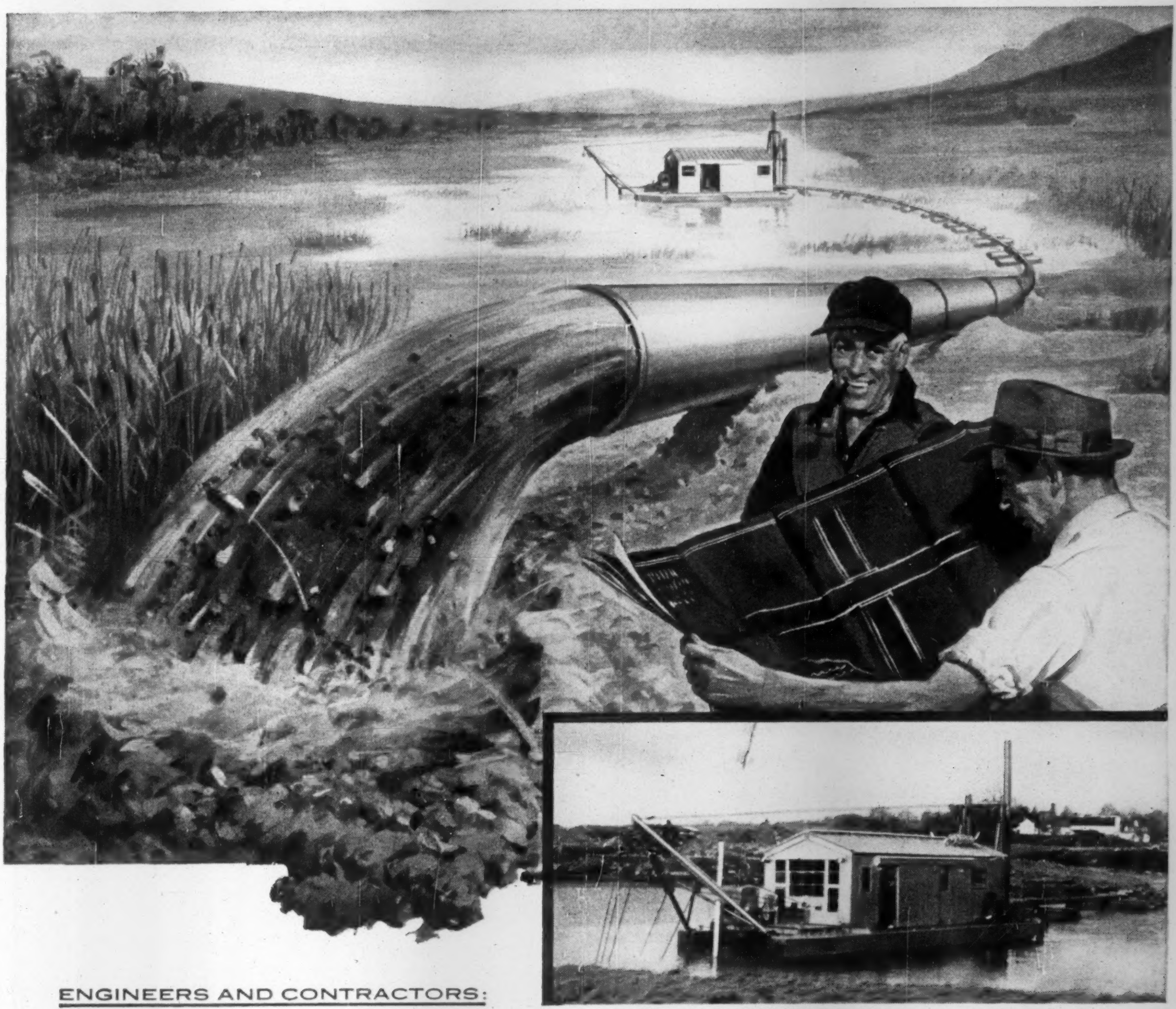
1957 Average Unit Price Bids on Selected Major Items

	Unit	Avg Price
Excavation, common	cy	$0.48
solid rock	cy	3.53
Borrow	cy	0.53
Clear & grub	ac	1.550
Excavation, channel, unclos	cy	0.77
structural	cy	6.53
Subbase, gravel	cy	0.95
Bit matl, dbl tack ct, w Peastone seal	gal	0.50
conc pavement	t	9.08
Concrete, cl B	cy	59.80
Structural steel	lb	0.23
RC pipe, 18"	lf	4.70
24"	lf	7.20
ACCGM pipe, 18"	lf	4.68
24"	lf	7.50
PACCGM underdrain, 6"	lf	2.33
2 cable GR with steel posts	lf	2.00
Sodding	sy	2.50
Top soil	cy	3.10

Unit Prices, Rhode Island

On 1957 Highway Contract

Item	Unit	Avg Price
Excavation, earth	cy	$0.566
rock & ledge	cy	1.99
trench, earth, 0-7'	cy	1.60
7-12'	cy	2.41
over 12'	cy	5.00
ledge, 0-7'	cy	7.52
7-12'	cy	10.50
over 12'	cy	14.00
Borrow	cy	0.87
Gravel foundation	cy	1.08
Grading, trim & fine	sy	0.11
Cement concrete base course, 8"	sy	3.15
Pavement, asphalt concrete, cl 1, 3"	sy	1.15
reinf cement concrete, 8"	cy	18.33
Curb, straight, granite	lf	3.26
cement concrete, precast	lf	2.51



ENGINEERS AND CONTRACTORS:

Ellicott 10" "DRAGON" building turnpike in Connecticut.

ELLICOTT HYDRAULIC DREDGES are vital to road construction

Unstable earth materials – in fact, all water-bound solids – call for selection of hydraulic dredges for road construction. Contractors almost universally prefer Ellicott dredges to obtain lowest cost per cubic yard of stable fill.

Particularly applicable to road-building in low-lying, boggy inland areas, Ellicott "DRAGON" Model Hydraulic Dredges are specially constructed to be taken apart and reassembled easily, allowing them to be transported overland from job to job by truck or lowboy, the primary problem of work in land-locked sections. Very little water is needed for flotation, while the discharge pipes of the Ellicott "DRAGON" can be set up to transport excavated material over distances of more than half a mile. The result of all these qualities?... a highly efficient and economical dredge whose versatility and portability make it a unique example of engineering skill "custom-tailored" to the job at hand.

"DRAGON" Model Hydraulic Dredges, built in size ranges from 8 to 20 inches for every dredging requirement, are the most economical means available for moving water-bound solids. Designed and manufactured by the Ellicott Machine Corporation, the oldest and largest exclusive builder of dredges and dredging equipment in the world. For more information, write for full, descriptive literature.

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Successors to the floating dredge business of the Bucyrus-Erie Co. and the American Steel Dredge Co. Complete engineering sales and repair parts service.

"A-W Super 99 is the best machine on the market" says Leo Russell, Russell Industries, Inc.

Russell Industries, Inc., Presto, Pa., asphalting contractor, specializes in building roads and parking lots. The company added another Austin-Western grader, a Super 99, to the team in June 1957—has three A-W graders now.

Leo Russell informs us: "We compared the new A-W Super 99 with other competitive graders and believe that it is the best machine on the market. It is excellent for leveling slag, does a faster job, and is easy to maintain. The all-wheel drive is an outstanding feature, and we also like the way you can grade curves without backtracking. Another thing that is very important is the fine service we get from our local A-W distributor. We've always been able to get good delivery on any parts we've needed."

Operator William H. Westfall says: "I've been operating graders for almost 30 years and consider the A-W Super 99 far superior to any other make. It's extremely maneu-

AUSTIN-WESTERN

A-W Super 99 Grader, owned by Russell Industries, Inc., shown spreading slag on parking lot project in Irwin, Pa. William H. Westfall is the operator.

verable, and no other grader can match the traction you get with all-wheel drive. The A-W will do any job any other grader will do and do it quicker, besides being a lot easier on the operator. Hydraulic controls let you do a more precise job than mechanical controls, and you don't get the 'kicking' that tires you out. With the torque converter and standard transmission, you have perfect control downgrade as well as up. Another reason why I like the A-W is the way you can go from grading to back sloping or ditching without leaving your seat and making special adjustments."

Find out for yourself why the men who know graders best put their money on Austin-Western. Write for free illustrated booklet.

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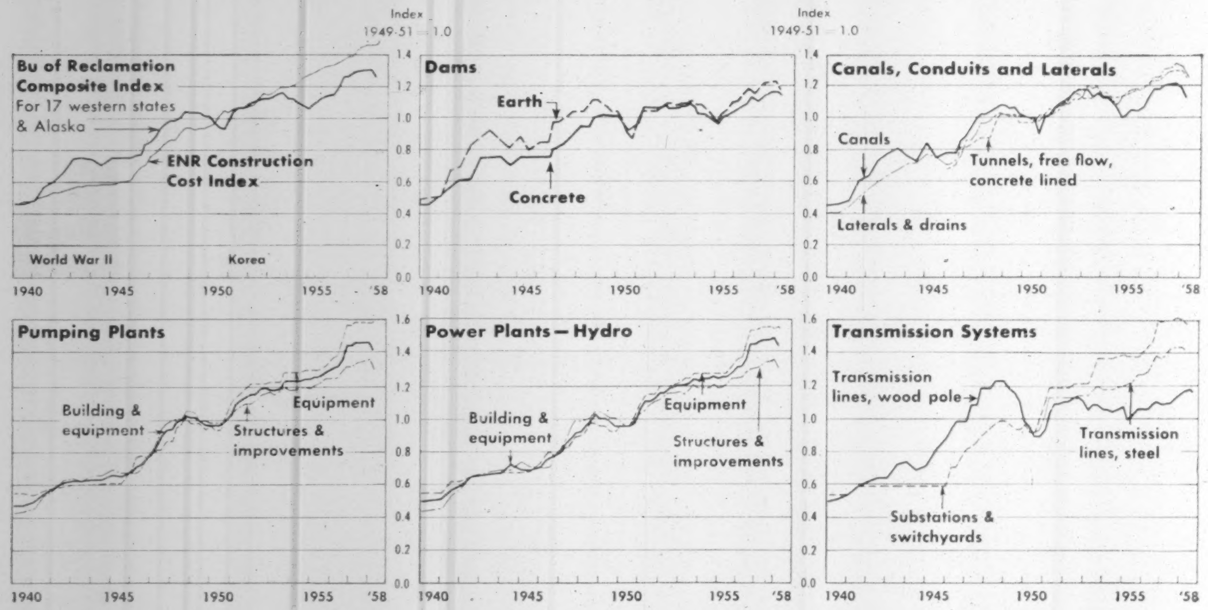
Second Quarterly Round up: ▶ **Irrigation & Hydro-Power Construction Cost Indexes**



Irrigation and Hydro Costs Drop

Cost of irrigation and hydro-power projects in 17 western states and Alaska turned downward between January and April '58. This is shown by the cost indexes computed by the Denver office of the U. S. Bureau of Reclamation (charts above, table below).

The Bureau of Reclamation composite cost index dropped from 1.30 in January to 1.26 in April '58, using average costs in the 1949-51 period as 1.0. This is the first decline in the index since January '55 (when it hit the bottom of a 15 month slide). The April index was 3% under the record high reached in October '57 and held through January.

The latest turndown cancelled a large chunk of the 21.5% rise in costs during the long upswing from April '55. Moreover, it pulled the composite below the April '57 level by 0.1%. But the current index is a hefty 17.8% higher than the January 1955 low.

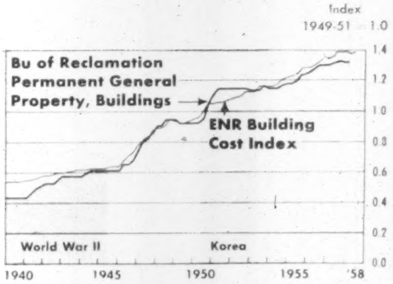
Though the composite index reflects the early 1958 trend in most types of work handled by the Bureau of Reclamation, some types of work did not join in the trend reversal. Building costs, for example, held in April to the January index level. The index for wood pole transmission lines actually rose by 1.7%. Another significant difference in the January-April '58 trends is that equipment items increased or held steady while construction items dropped. Indexes for pumps and prime equipment for pumping plants moved up 0.6% in April while the index for reinforced concrete structures and improvements dropped by 4.4% and the cost of discharge pipes fell 3.5%.

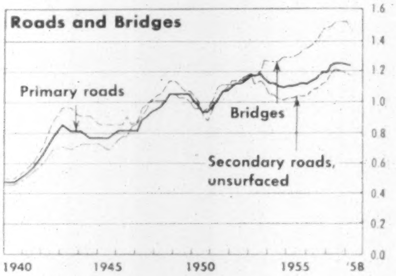
Irrigation and Hydro-power Construction Cost Indexes

US Bureau of Reclamation, Office of Assistant Commissioner and Chief Engineer, Denver, Colo.

Class of Construction	1940 Jan.	1941 Jan.	1942 Jan.	1943 Jan.	1944 Jan.	1945 Jan.	1946 Jan.	1947 Jan.	1948 Jan.	1949 Jan.	1950 Jan.	1951 Jan.	1952 Jan.	1953 Jan.	1954 Jan.	1955 Jan.	1955 Apr.	1955 July	1955 Oct.	1956 Jan.	1956 Apr.
Composite Index	**0.47**	**0.49**	**0.61**	**0.75**	**0.75**	**0.76**	**0.76**	**0.86**	**0.99**	**1.04**	**1.02**	**1.01**	**1.10**	**1.13**	**1.13**	**1.07**	**1.09**	**1.11**	**1.14**	**1.15**	**1.16**
Dams, earth	0.50	0.52	0.70	0.88	0.87	0.89	0.85	0.98	1.05	1.12	1.05	0.98	1.05	1.09	1.09	0.98	1.03	1.05	1.07	1.07	1.08
Dams, concrete	0.47	0.52	0.62	0.76	0.76	0.76	0.76	0.83	0.95	1.00	1.02	1.02	1.07	1.07	1.04	0.97	1.00	1.02	1.04	1.04	1.06
Pumping plants, building & equip	0.48	0.50	0.58	0.63	0.64	0.67	0.69	0.80	0.95	1.02	0.97	1.04	1.16	1.18	1.24	1.25	1.26	1.26	1.29	1.31	1.33
structures, reinf conc, & improv	0.43	0.46	0.57	0.64	0.66	0.70	0.68	0.80	1.00	1.06	0.98	1.02	1.10	1.17	1.18	1.19	1.21	1.22	1.24	1.24	1.25
equipment	0.55	0.54	0.58	0.60	0.60	0.61	0.70	0.78	0.87	0.98	0.97	1.10	1.22	1.23	1.29	1.30	1.30	1.30	1.33	1.38	1.39
pumps & prime equipment	....	....	....	not available		....	....	....	....	0.94	0.97	1.08	1.22	1.28	1.34	1.35	1.35	1.35	1.38	1.44	1.46
accessory elec & misc equip	....	....	....	"	"	....	....	....	....	1.05	0.97	1.10	1.18	1.12	1.19	1.20	1.20	1.20	1.23	1.25	1.26
discharge pipes	....	....	....	"	"	....	....	0.82	0.92	1.10	0.94	1.08	1.17	1.21	1.30	1.32	1.34	1.36	1.46	1.47	1.50
Canals	0.46	0.49	0.64	0.78	0.77	0.85	0.78	0.89	1.02	1.08	1.01	1.00	1.11	1.18	1.13	1.00	1.02	1.05	1.06	1.06	1.08
Conduits, tunnels, free flow, conc lined	....	....	....	not available		....	0.68	0.82	0.88	1.02	0.97	1.02	1.08	1.13	1.16	1.14	1.15	1.16	1.17	1.17	1.19
Laterals and drains	0.41	0.45	0.56	0.64	0.71	0.77	0.70	0.86	0.97	1.02	1.00	1.01	1.10	1.14	1.14	1.15	1.16	1.18	1.18	1.18	1.19
Primary roads	0.48	0.53	0.67	0.86	0.82	0.77	0.82	0.82	0.96	1.06	1.01	0.99	1.11	1.18	1.13	1.11	1.11	1.12	1.12	1.12	1.14
Secondary roads, unsurfaced	0.50	0.55	0.71	0.96	0.91	0.86	0.86	0.88	1.04	1.14	1.04	0.96	1.14	1.19	1.05	1.03	1.03	1.04	1.04	1.04	1.07
Bridges, steel	0.46	0.50	0.60	0.71	0.73	0.73	0.76	0.87	1.01	1.06	0.96	1.01	1.12	1.19	1.27	1.30	1.30	1.32	1.35	1.36	1.38
Power plants, hydro, building & equip	0.50	0.52	0.60	0.68	0.68	0.70	0.71	0.80	0.93	1.01	0.96	1.06	1.16	1.21	1.24	1.25	1.26	1.26	1.28	1.31	1.32
structures, reinf conc, & improv	0.44	0.46	0.58	0.67	0.69	0.74	0.70	0.82	0.99	1.05	0.99	1.03	1.12	1.17	1.19	1.19	1.20	1.22	1.24	1.24	1.25
equipment	0.55	0.55	0.62	0.66	0.68	0.67	0.73	0.79	0.90	0.96	0.96	1.09	1.20	1.23	1.28	1.28	1.28	1.28	1.31	1.36	1.37
turbines & generators	0.56	0.56	0.64	0.68	0.70	0.69	0.76	0.81	0.89	0.97	0.97	1.08	1.22	1.27	1.31	1.31	1.31	1.31	1.33	1.39	1.39
accessory electrical equipment	0.54	0.55	0.55	0.58	0.58	0.59	0.65	0.74	0.99	1.01	0.92	1.14	1.20	1.15	1.22	1.24	1.24	1.24	1.26	1.29	1.30
miscellaneous equipment	0.51	0.53	0.58	0.65	0.68	0.70	0.70	0.76	0.89	1.05	0.97	1.08	1.13	1.15	1.17	1.20	1.21	1.23	1.26	1.29	1.31
penstocks	....	....	....	not available				0.82	0.92	1.10	0.94	1.08	1.17	1.21	1.30	1.32	1.34	1.36	1.46	1.47	1.50
Transmission switchyards & substations	0.54	0.54	0.59	0.59	0.59	0.59	0.59	0.81	0.92	0.99	0.97	1.11	1.19	1.22	1.37	1.39	1.38	1.38	1.38	1.41	1.43
Transmission lines, wood pole, 115kv	0.50	0.54	0.62	0.64	0.74	0.72	0.89	0.99	1.19	1.24	0.99	0.94	1.11	1.11	1.06	1.08	1.00	1.02	1.05	1.06	1.06
Transmission lines, steel tower, 230kv	....	....	....	not available		....	....	....	....	....	....	1.02	1.13	1.14	1.18	1.20	1.21	1.22	1.27	1.28	1.29
Permanent general property, buildings	0.44	0.44	0.53	0.58	0.58	0.62	0.62	0.75	0.91	0.95	0.93	1.11	1.15	1.14	1.15	1.18	1.18	1.20	1.25	1.25	1.26

Based on combined costs of material and labor furnished by the contractor and material and labor furnished by the government on Bureau of Reclamation projects in 17 western states and





in 1958

While the "steel and concrete" costs of hydro plants skidded 4.1% between January and March, the cost index for turbines and generators rose 0.6%.

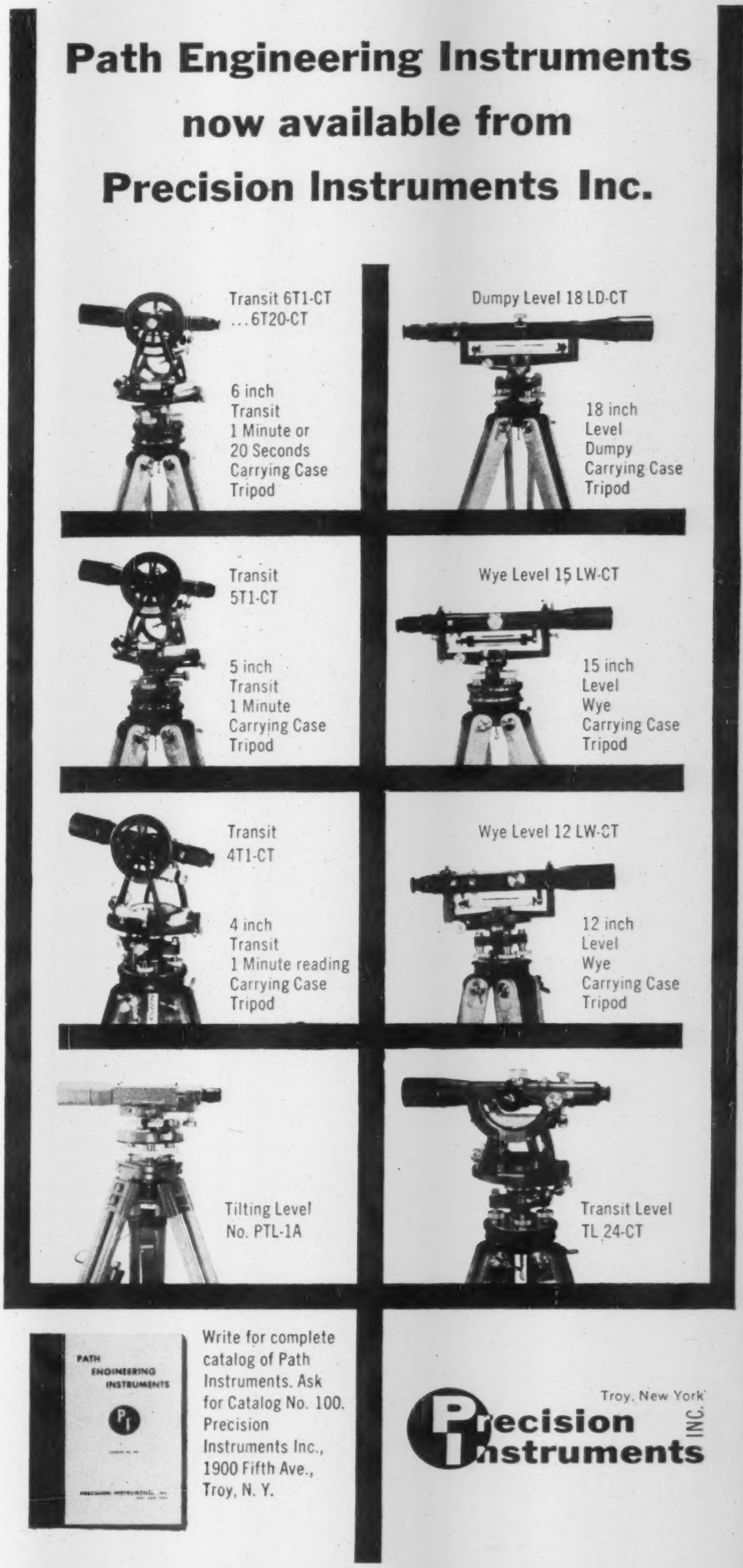
Cost of earth dams dropped more than concrete dams in April. For earth dams, the three months decline amounted to nearly 5% and pulled their cost 1.7% under a year ago.

For other heavy construction cost indexes see ENR March 10, 1958, page 46, and ENR Oct. 17, 1957.

—1949-41=1.0

1956		1957				1958	
July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.
1.19	**1.24**	**1.24**	**1.27**	**1.29**	**1.30**	**1.30**	**1.26**
1.13	1.17	1.15	1.19	1.22	1.22	1.23	1.17
1.09	1.12	1.11	1.14	1.15	1.16	1.16	1.14
1.37	1.43	1.43	1.45	1.46	1.46	1.46	1.41
1.28	1.31	1.31	1.32	1.34	1.35	1.36	1.30
1.45	1.56	1.56	1.58	1.58	1.58	1.58	1.59
1.54	1.64	1.64	1.66	1.66	1.66	1.66	1.67
1.30	1.41	1.41	1.43	1.44	1.44	1.44	1.44
1.53	1.66	1.66	1.68	1.72	1.72	1.72	1.66
1.13	1.18	1.18	1.20	1.21	1.21	1.19	1.12
1.23	1.24	1.24	1.25	1.29	1.30	1.30	1.25
1.20	1.26	1.26	1.31	1.32	1.35	1.32	1.26
1.16	1.19	1.19	1.23	1.25	1.25	1.24	1.22
1.08	1.11	1.13	1.18	1.21	1.20	1.19	1.18
1.40	1.47	1.47	1.48	1.52	1.52	1.52	1.46
1.37	1.44	1.44	1.46	1.47	1.47	1.48	1.42
1.28	1.30	1.30	1.31	1.33	1.34	1.36	1.30
1.44	1.53	1.53	1.55	1.55	1.55	1.54	1.55
1.46	1.57	1.57	1.58	1.58	1.58	1.58	1.59
1.34	1.44	1.44	1.46	1.48	1.48	1.48	1.48
1.34	1.43	1.43	1.44	1.44	1.44	1.40	1.40
1.53	1.66	1.66	1.68	1.72	1.72	1.72	1.66
1.47	1.59	1.59	1.60	1.60	1.61	1.60	1.58
1.09	1.11	1.09	1.09	1.10	1.13	1.16	1.18
1.33	1.39	1.37	1.39	1.43	1.43	1.43	1.42
1.29	1.30	1.30	1.30	1.31	1.31	1.30	1.30

Alaska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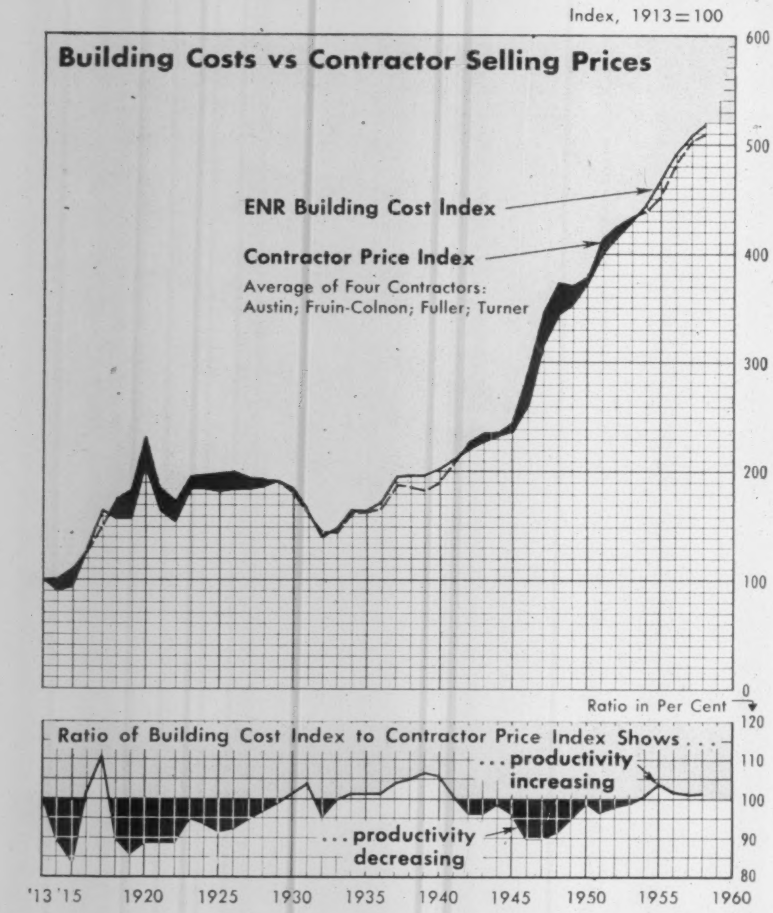

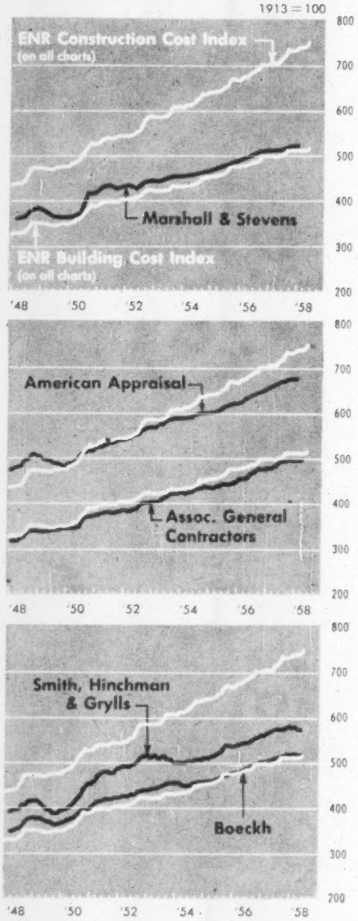

Building Costs Are Moving Up

Building Cost & Price Indexes

Year to Month	Weighted Cost Indexes: ENR Construction	ENR Building	American Appraisal Company	Assoc. Gen'l Contractors	Marshall & Stevens	E. H. Boeckh: Comm'l & Factory Bldg **	Smith Hinchman & Grylls #	Contractor Selling Price Indexes: Austin #	Fruin-Colnon	Fuller	Turner †
1913	100	100	100	100	100	100	100	100	100	100	100
1926	208	185	217	197	185	181	185	185	218	202	195
1932	157	141	155	171	130	144	128	117	178	157	136
1939	236	197	200	188	183	191	199	152	208	195	182
1946	346	262	322	257	288	275	319	273	285	290	318
1949	477	352	490	342	365	369	395	307	382	382	413
1955	660	469	608	439	479	465	522	366	483	462	498
1956	692	491	635	462	503	489	544	400	503	482	544
1957 av	**724**	**509**	**663**	**483**	**515**	**507**	**568**	**420**	**512**	**504**	**576**
Jun	721	504	664	485	514	507	568	418	510	509J	580J
Sep	738	516	670	490	522	513	572	424	514	...	...
Oct	737	517	672	490	...	512	574	...	514	513	580
Nov	737	517	672	491	...	512	572	...	514	...	...
Dec	738	517	672	490	523.5	512	572	426	514	...	...
1958:											
Jan	743	517	673	493	...	513	574	...	517	519	580
Feb	744	516	673	493	...	512	572	...	517	...	...
Mar	744	516	674	493	524	511	570	426	517	...	...
Apr	746	517	...	494	...	512	572	...	518	521	573
May	752	518	...	498	...	513	572	...	...	...	...
Jun	757	521	...	...	...	...	...	...	...	...	...

** Index reported on 1926-29 base # Index reported on 1926=100 base † Index reported on 1939=190 base J July value

Most building cost and price indexes are moving up again after leveling off late in '57 and in the first quarter. Pressure of substantial wage increases often exceeding those won by construction workers in '57 and the firming up in lumber prices broke up the recent stability.

The June value of ENR's 20-cities Building Cost Index is a record 521.09 based on 1913 as 100. This is about five points higher than in February when the index dipped to a seven months low. The 20-cities Construction Cost Index for June is also a new high of 757.31 based on 1913 costs as 100. This is 19 points greater than its December '57 value.

Other weighted cost indexes (see charts above right) also moved up.

Building contractor price indexes reached no common ground for agreement in the early months of this year. The Turner construction cost index

ENR Indexes for 22 Cities

Construction Cost Index, 1913 = 100

City	June '49	June '55	June '56	1957 Mar	1957 Jun	1957 Sep	1957 Dec	1958 Mar	1958 Jun
Atlanta	345	472	502	523	523	550	548	558	558
Baltimore	425	575	595	642	643	670	670	672	701
Birmingham	389	511	549	556	556	563	593	593	593
Boston	526	696	744	744	746	773	765	764	793
Chicago	526	741	788	789	831	838	836	835	838
Cincinnati	487	664	680	711	713	751	748	745	746
Cleveland	514	762	809	820	856	861	859	847	849
Dallas	398	488	509	525	525	547	547	547	553
Denver	482	637	670	697	702	710	710	725	725
Detroit	489	763	800	809	823	832	831	852	852
Kansas City	501	685	709	715	735	742	742	742	762
Los Angeles	478	672	733	731	731	778	778	773	814
Minneapolis	504	711	747	758	781	788	788	803	818
New Orleans	379	535	564	563	572	581	591	588	591
New York	534	750	819	852	852	890	888	910	912
Philadelphia	492	711	737	749	780	776	775	775	795
Pittsburgh	492	669	688	762	762	791	788	804	819
St. Louis	508	720	756	760	789	796	796	814	840
San Francisco	478	676	726	720	758	763	761	758	798
Seattle	530	681	720	746	749	756	747	785	789
Montreal	408	525	560	560	586	587	591	584	603
Toronto		543	562	596	611	608	609	607	605
U. S. Average	**474**	**656**	**692**	**709**	**721**	**738**	**738**	**744**	**757**

Building Cost Index, 1913 = 100

City	June '49	June '55	June '56	1957 Mar	1957 Jun	1957 Sep	1957 Dec	1958 Mar	1958 Jun
Atlanta	308	399	424	442	442	458	456	456	461
Baltimore	349	452	491	499	503	518	520	523	527
Birmingham	329	423	447	457	457	468	476	477	480
Boston	362	471	503	507	518	531	523	522	528
Chicago	349	477	500	504	511	530	528	527	535
Cincinnati	356	456	475	486	489	507	504	501	502
Cleveland	332	477	508	509	522	527	524	512	515
Dallas	322	406	424	439	439	451	451	451	459
Denver	351	474	488	523	510	522	522	524	525
Detroit	336	490	514	528	535	545	545	545	545
Kansas City	357	477	497	505	503	516	516	517	527
Los Angeles	339	457	491	494	496	508	513	507	514
Minneapolis	361	493	515	527	530	537	537	537	547
New Orleans	325	439	457	463	467	477	481	478	477
New York	398	533	556	578	578	590	591	593	601
Philadelphia	394	523	538	556	560	562	561	561	569
Pittsburgh	375	489	500	541	541	566	568	569	573
St. Louis	375	495	522	529	538	546	546	552	558
San Francisco	341	447	476	485	486	497	506	503	507
Seattle	328	418	444	452	456	467	458	466	470
Montreal	316	405	437	437	451	452	453	446	449
Toronto		449	450	462	469	468	471	470	468
U. S. Average	**349**	**465**	**489**	**501**	**504**	**516**	**516**	**516**	**521**

declined in April after holding steady from July '57 through January '58. The Austin Co. index held steady between December and March.

But the Furin-Colnon Contracting Co. and George A. Fuller Co. indexes rose slightly in the first four months of this year.

For the historical record and full description of these building cost indexes see ENR's first quarterly construction cost and estimating guide, ENR March 20, p. 38.

ENR Cost Indexes for 20 US and 2 Canadian cities are computed weekly and published in CONSTRUCTION DAILY. These Indexes are updated with official monthly values on the Scoreboard page.

Monthly Index History

Historical record of ENR cost indexes, graphs and tables is in the supplement to Engineering News-Record, October 17, 1957 by Business News Department, Engineering News-Record, P. O. Box 89, Times Square Station, New York 36, N. Y. Reprints are available at $1.00 each.

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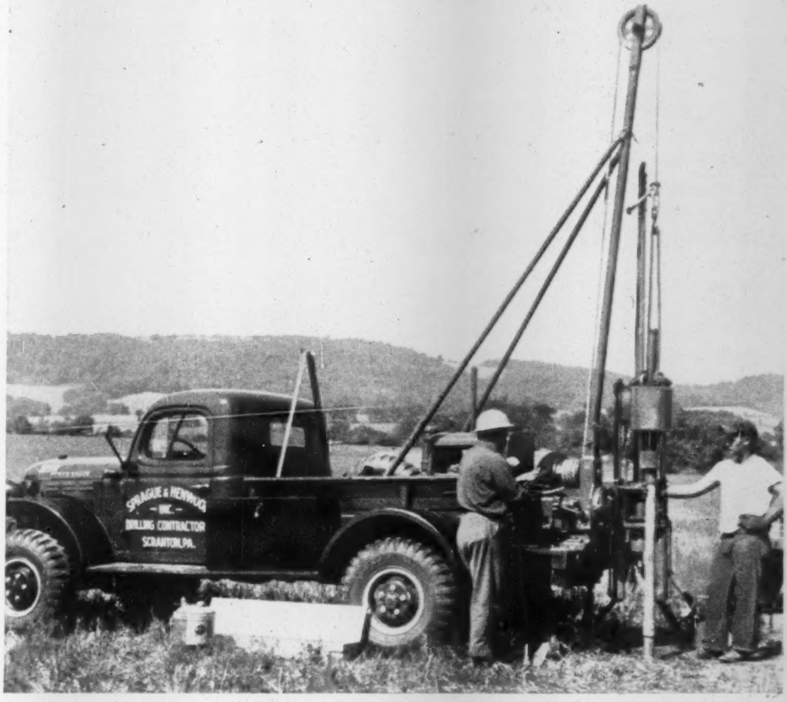

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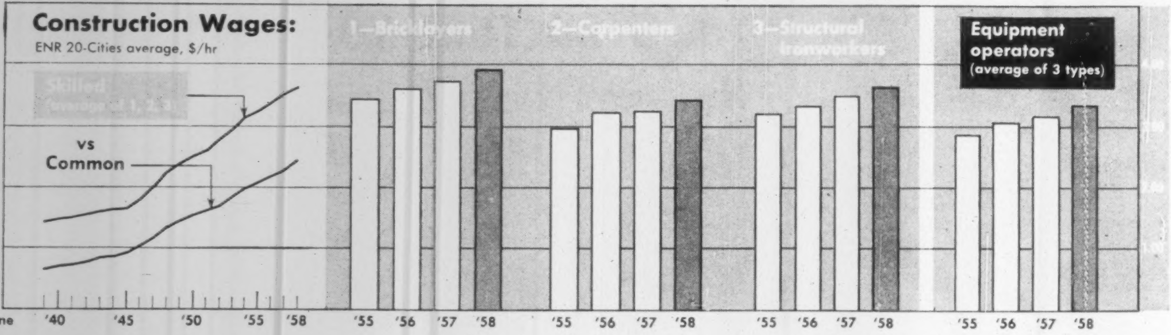
Second Quarterly Round up: Construction Wages — Construction Materials



Labor Hammers Out Bigger Gains in 1958

In recession-ridden '58, construction workers are racking up the largest year-to-year gains since 1953. New 1958 contracts and existing long-term contracts pushed the ENR 20-cities average rate for the three key skilled trades up 18 cents an hour higher than in June '57. The average for common labor on building and heavy construction rose 16 cents. For the average of three types of equipment operators, it jumped 21 cents (tractor operators, power crane and shovel operators and air compressor operators).

As of June 1, the averages were: bricklayers $3.936 per hour; carpenters $3.434; structural ironworkers $3.677; common labor $2.440; and equipment operators (average of three types) $3.359 per hour. All rates include fringe benefits paid by the contractor, generally on the basis of so many cents an hour.

Efforts by contractors to hold the wage line were largely unavailing as most unions won large pay boosts. Long strikes punctuated contract negotiations in many areas, sometimes shutting down all construction. But in a few scattered areas—like some New Jersey counties—building trades agreed to forego wage hikes for a year or settled for much less than their original demands.

The biggest 1958 wage hike to date goes to New York City bricklayers: a 55-cent-plus package in a two-year contract. This agreement provides for a 20-cent increase June 1, '58, 20 cents more on January 1, '59, and 15 cents on June 1, '59. In addition, the welfare funds fringe benefit is upped 1%. The current new rate for New York bricklayers is $4.828 per hour, highest rate paid among the three skilled building trades in the ENR 20 cities.

The high pressure exerted by labor on construction costs is evident when you look at cost indexes. Labor accounts for 64% of the ENR Construction Cost Index now compared with 47% five years ago. Similarly, skilled labor represents 48% of the ENR Building Cost Index as against 31% in 1953.

Materials Prices Are Edging Upward Slowly

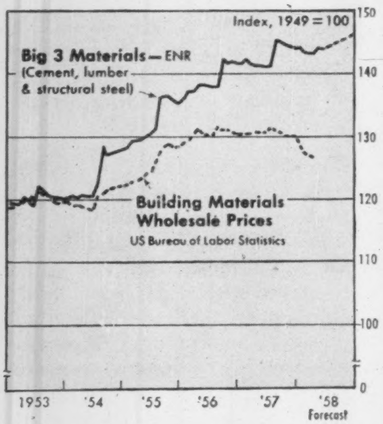
Construction materials price stability cracked in the second quarter as some materials—mainly lumber—began a slow rise, offsetting scattered drops in cement prices. ENR's price index for the three big items, lumber, cement, and steel, edged up 0.4% in the last three months. But it's still under the August 1957 all-time high (see chart).

Stronger demand for lumber exerts steadily increasing upward pressure on prices. Douglas fir prices are up in nine cities, southern pine in six. Declines in cement prices in four of the ENR 20-cities offset part of lumber's upward push on materials costs.

But the latest Bureau of Labor Statistics Wholesale Price Index of Building Materials has not yet reversed its steady decline since last July.

In the second quarter, lumber prices ended a virtually uninterrupted decline since 1956. Stronger demand lifted ENR's average for Douglas fir 2 x 4's up 1.3% over March, while the southern pine price average edged up 0.7%.

Portland cement prices declined in four of the 20 U.S. cities and in Toronto, Canada, in recent weeks. While no manufacturers reduced the mill price of cement, several freight reductions were passed on by distributors to the contractor. Bulk prices are down 5 to 20 cents per barrel in New York, Boston, Baltimore, Seattle, and Toronto. New Orleans, however, reported a rise in Portland cement prices.



Third quarter cement price reductions are possible, at least at a few mills. Four major cement companies already have announced that they will hold the line on prices in the third quarter. But a capacity increase of roughly 26 million barrels per year throughout the industry has brought supply in line with demand, and keen competition may bring a few price reductions.

Structural steel prices remain steady, but extensive shading and increased discounts are reported in many localities. One firm, Granite Steel Co., has announced a $2.00 reduction on most of its sheet and plate products. Third quarter steel prices are due for a hike in the wake of automatic wage increases in July. But it is possible that some companies may hold to current prices.

Other construction materials reflect the slight but definite second quarter upturn of the Big Three. Ready-mixed concrete, building board and sheathing, and structural clay tile rose 0.2% to 0.6% in the second quarter. Lime and concrete sewer pipe prices jumped 4% to 5%. Notable exceptions to the general picture are prices of insulation, down about 0.7%, and concrete blocks and brick, off 0.4% from March.

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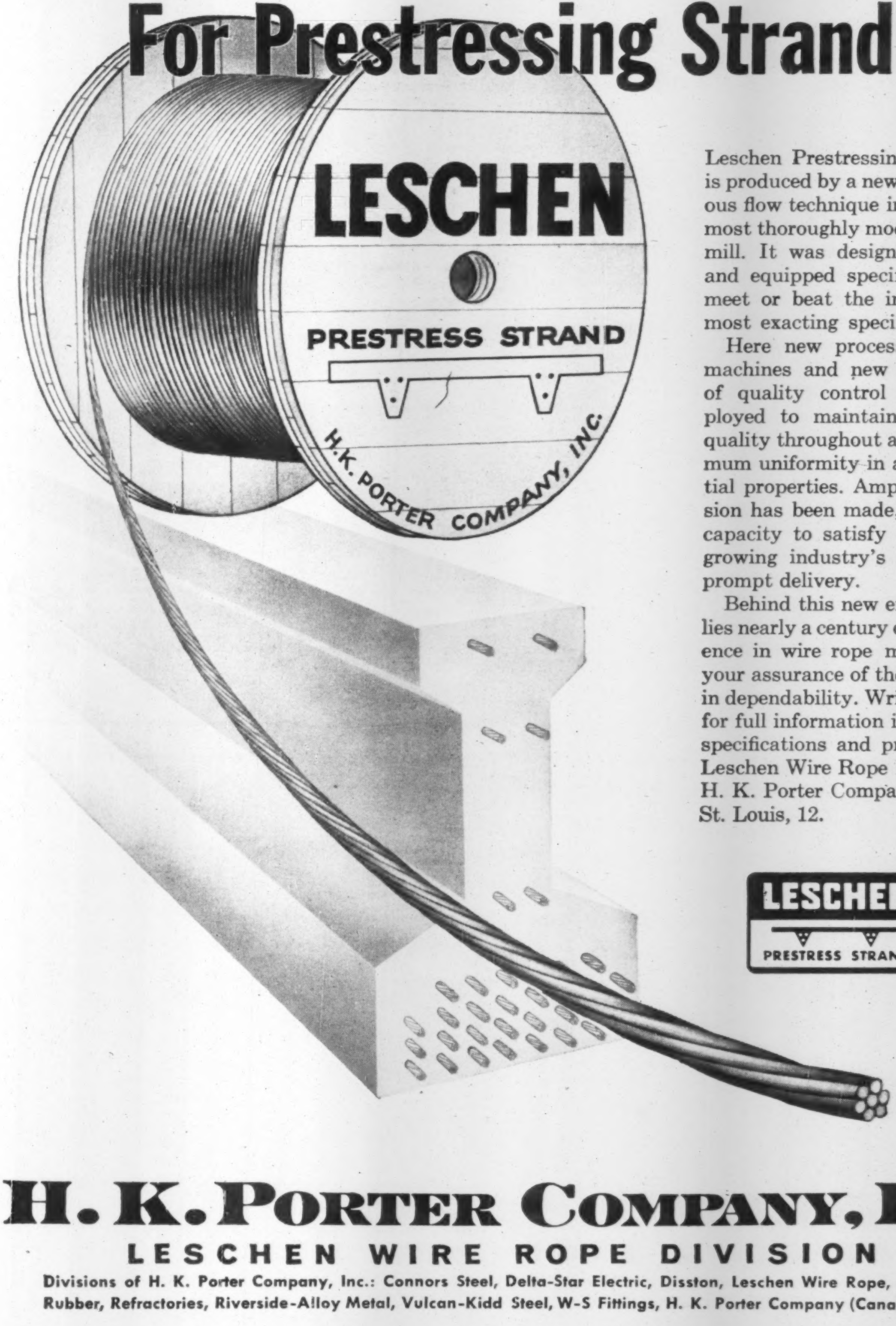

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Materials Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Clay Products, Lime, Plaster, Paint, Roofing: Last, May 29: Next, Jun. 26
- Wage Rates, Building Board, Lath, Insulation: Last, May 29: Next, Jul. 3.
- Cement Agregates, Ready-mixed Concrete Asphalt: Last, Jun. 5: Next, Jul. 10.
- Iron & Steel Products, Pipe: Last Jun. 12; Next, Jul. 17.

LUMBER, TIMBER, PLYWOOD—PER M FT., B. M., CARLOAD LOTS F. O. B.

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Atlanta †	**$73.00**	**$76.00**	**$76.00**	**$79.00**	**$81.00**	**$86.00**	**$136.00**	......	......	**$121.00**	**$156.00**	$22.32	$27.24
Baltimore *	**95.00**	**100.00**	**100.00**	**100.00**	**100.00**	**105.00**	**114.00**	......	......	**170.00**	**185.00**	25.92	31.60
	100.00g	*105.00g*	*123.00g*	*123.00g*	*123.00g*	*123.00g*	*133.00g*	*$150.00*	*$144.00*	......	......	......	......
Birmingham †	**80.00**	**82.00**	**75.00**	**82.00**	**85.00**	**90.00**	**105.00**	......	......	**115.00**	**160.00**	21.78	26.58
	70.50	*70.50*	*67.00*	*70.00*	*70.00*	*85.00*	*73.50*	*70.50*	*70.50*	......	......	......	......
Boston 3	**92.00f**	**94.00f**	**100.00f**	**100.00f**	**100.00f**	**106.00a**	......	......	......	......	......	25.92	31.60
	94.00k	*94.00k*	*111.00*	*111.00*	*111.00*	*110.00*	*118.00*	*118.00*	*123.00*	......	......	......	......
Chicago **	**95.00**	**98.00**	**92.00**	**106.00**	**114.00**	**115.00**	**110.00**	......	......	**138.00**	**138.00**	22.45	27.37
	103.00	*103.00*	*116.00*	*114.00*	*114.00*	*115.00*	*123.00*	*123.00*	*123.00*	......	......	......	......
Cincinnati *	**93.00**	**94.25**	**86.50**	**90.50**	**95.50**	**102.75**	**116.00**	......	......	**129.50**	**127.50**	25.00	30.48
	92.00	*93.25*	*97.50*	*99.50*	*100.25*	*111.25*	*123.50*	*123.50*	*123.50*	......	......	......	......
Cleveland **	**90.00**	**93.00**	**90.00**	**97.00**	**97.00**	**101.00**	......	......	......	......	......	25.37	30.93
	......	......	*100.00*	*96.50*	*99.00*	*103.00*	*115.00*	*115.00*	*115.00*	......	......	......	......
Dallas k‡	**74.50**	**74.50**	**70.00**	**70.00**	**70.00**	**75.50**	**120.00**	......	......	**130.00**	**125.00**	18.72	22.80
Denver *	*Not in stock*		*127.50R*	*122.50*	*122.50*	*127.00*	*136.00*	*148.50*	*153.80*	......	......	13.92	16.98
Detroit ‡	**116.50**	**119.00**	**115.75**	**117.00**	**122.00**	**122.00**	......	......	......	**130.00**	......	25.00	30.48
	125.00	*125.00*	*127.75*	*132.50*	*130.00*	*135.00*	*185.00*	*195.00*	*195.00*	......	......	......	......
Kansas City 3	**120.00**	**120.00**	**120.00**	**120.00**	**125.00**	**135.00**	......	......	......	......	......	16.56	20.16
	120.00	*120.00*	*120.00*	*120.00*	*125.00*	*125.00*	*150.00*	*225.00*	*225.00*	......	......	......	......
Los Angeles 1	*92.00*	*92.00*	*92.00*	*92.00*	*92.00*	*92.00*	*120.00*	*125.00*	*125.00*	......	......	16.61ab	20.25ab
Minneapolis ♯	*135.00m*	*135.00m*	*140.00*	*140.00*	*140.00*	*140.00*	*185.00*	*185.00*	*185.00*	......	......	19.89	24.25
Montreal ab	**87.00**	**94.00**	**87.00**	**88.00**	**104.00**	**125.00**	......	......	......	**122.00**	**122.00**	......	......
	165.00	*165.00*	*165.00*	*165.00*	*165.00*	*165.00*	*170.00*	*170.00*	*170.00*	......	......	......	......
New Orleans †	**87.00**	**87.00**	**89.50**	**91.00**	**90.00**	**97.00**	**121.50**	......	......	**161.00**	**161.00**	18.72	22.80
†	*105.00*	*105.00*	*94.50*	*115.00*	*115.00*	*115.00*	*127.50*	*127.50*	*147.50*	......	......	......	......
New York 3	**108.00**	**109.00**	**114.00**	**116.00**	**116.00**	**120.00**	......	......	......	**240.00**	**250.00**	25.92	31.60
	......	......	*119.00*	*120.00*	*120.00*	*121.00*	*164.00*	*164.00*	*164.00*	......	......	......	......
Philadelphia ‡		**Range from 100/120**				**105/125**	**105/125**	......	......	**214/224**	**214/224**	28.00	32.00
		Range from 110/140				*115/145*	*125/150*	*158.00*	*158.00*	......	......	......	......
Pittsburgh 2	**120.00**	**120.00**	**125.00**	**120.00**	**125.00**	**130.00**	**145.00**	......	......	**140.00**	**168.00**	25.92	31.60
	135.00	*135.00*	*145.00*	*145.00*	*140.00*	*145.00*	*165.00*	*168.00*	*168.00*	......	......	......	......
St. Louis ♯	**116.00**	**118.00**	**126.00d**	**126.00d**	**126.00e**	**131.00e**	......	......	......	......	......	18.72	22.80
	......	......	*134.00*	*134.00e*	*134.00e*	*138.00e*	*192.00e*	*192.00*	*192.00*	......	......	......	......
San Francisco l	*74.00*	*74.00*	*80.00*	*80.00*	*80.00*	*80.00*	*96.00*	*109.00*	*109.00*	......	......	12.22	14.91a
Seattle †	*59.00*	*67.00*	*69.00*	*69.00*	*69.00*	*69.00*	*75.00*	*88.00*	*88.00*	......	......	......	......
Toronto a	**92.50**	**93.50**	**90.75**	**90.00**	**90.00**	**90.00**	......	......	......	**92.00**	......	......	......
	115.00	*113.00*	*117.75*	*120.00*	*123.00*	*126.00*	*142.00*	*135.00*	*145.00*	......	......	......	......

† F.o.b. mill. * F.o.b. city, CL, out of yard. ** F.o.b. city, CL, direct mill shipment. ‡ Deliv. to contr. CL. 1. Retail, LCL, at yard. ♯ Retail, LCL, deliv. 2. Deliv. truck lots. 3. asd., truckload lots, 5/6 Mftbm

LUMBER: Bold Face Type, Southern Pine. Italics, Douglas Fir. *a Spruce. *b Tax exempt. *c 5M lots. *d 8, 10, & 12 ft. lengths. *e 8 to 16 ft. lengths. *f Hemlock *g No. 1 common. *j 8 ft. lengths. *k No. 3 common. *l Incl rail rate from Northwest mills to San Francisco are $11.50 to $15.00 per M ft. bm. From Northern Calif. mills $9.00 by rail, $9.50 by truck. All rates for surfaced stock. For rough, add $3.00 to above figures. *m Up to 16" *R revised

PLYWOOD (Plyform, oiled and edge sealed): Douglas fir, 4′ x 8′ panels, 5-ply sanded 2 sides, carload lots, delivered per 1000 sq. ft. surface. Seattle base price, interior, moisture resistant, 5/8", $146.00; 3/4", $168.00. Exterior, waterproof, 5/8" $150.00; 3/4", $170.00. For other centers add rail freight increment from table on proper size. *a Lower rate by water shipment. *b 50,000 lbs. minimum.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS Discounts from jobbers list, Feb. 1, 1950a Single or Double Strength A quality	B quality	EXPLOSIVES Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 200 lb. lots*
Atlanta	78%c	78%e	$0.2615
Baltimore	74%d	76%d	.2615
Birmingham	82%	83%	.2465
Boston	72-10%	72-10%	.2615
Chicago	72%	72%	.2615
Cincinnati	74%	74%	.2615
Cleveland	74-2-10%	74-2-10%	.3015
Dallas	76%	76%	.2690
Denver	74%	74%	.2665
Detroit	74-10-10%	74-10-10%	.2615
Kansas City	74-10-10%	74-10-10%	.2665
Los Angeles	70%	76%e	.2640
Minneapolis	71-10%	71-10%	.2665
Montreal	40-10-5%bc	40-10-5%b	22.05h
New Orleans	75%	76%	.2665
New York	79-10%	79-10%	.45g
Philadelphia	74-10%	75-10%	.2615
Pittsburgh	72%	72%	.2615
St. Louis	72-10-10%	72-10-10%	.2665
San Francisco	60%-25%	68%-25%	.2615
Seattle	67%	72%*	.2640

Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.

Glass: *a Jobbers' list price per box, 14 x 20, ss, $42.75 for A quality, $37.50 for B quality; 14 x 20, ds, $60.00 for A quality, $52.75 for B quality. *b sales tax extra. *c 77% or single strength. *d Discount 6/15/52. *e 77% for double strength.

Explosives: * Cartridges of 1¼", 1½", 1¾", 2", 2¼", 2½", 3" diameters. Urban prices influenced by service charges or local storage and delivery regulations do not consistently reflect quantity prices in less congested areas. *g In borough of Kings, Queens, and Richmond and in Manhattan south of Canal St., add delivery charge of $20.00 per trip. *h F.o.b. Bellowell (near Montreal), per 100 lb. forcite, 40%. Forcite 60%, $23.80

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E of the Miss., except Fla and Me	$0.2065	$0.2465	$0.2615
W of Miss. to Rocky Mtn. States, Fla. and Maine	.2115	.2515	.2665
Rocky Mtn. States	.2115	.2515	.2665
Pacific N. W. States	.2090	.2490	.2640
Pacific S. W. States	.2065	.2465	.2615

PILES, TIES F. O. B.

PILES

Prices per linear foot, fir and pine, bark off, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail Pine*	By Rail Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.51	....
12-in.—2-ft. from butt	6-in.	50 to 59-ft.	.54	....
12-in.—2-ft. from butt	6-in.	60 to 69-ft.	.58	....
12-in.—2-ft. from butt	6-in.	90 to 100-ft.	....	....
13-in.—3-ft. from butt	5-in.	91 to 100-ft.	....	....
14-in.—2-ft. from butt	6-in.	50 to 69-ft.	.50/68	....
14-in.—2-ft. from butt	6-in.	70 to 79-ft.	.78/.88	93
14-in.—2-ft. from butt	5-in.	80 to 85-ft.	.88/93	94
14-in.—2-ft. from butt	5-in.	85 to 89-ft.	....	1.00
14-in.—2-ft. from butt	5-in.	90 to 100-ft.	....	1.02

* Pine piling over 80-ft. available only in limited quantities.

RAILWAY TIES

Prices f.o.b. per tie box carload lots:		6" x 8" x 8′ Untr.	6" x 8" x 8′ Tr.	7" x 8" x 8′6" Untr.	7" x 8" x 8′6" Tr.
Birmingham*	Hardwood, Grade 3	$1.70	$2.55	Gr. 5 $2.25	$3.33
	Grade 2	1.50	2.35	" 4 2.10	3.18
	Grade 1	1.15	2.00	" 3a 1.70	2.78
Chicago	Red Oak	....	3.80a	.....	4.40a
New York	S. L. Sap Pine	2.00	4.00	3.00	6.00g
	Mixed Oak	2.50	4.50	3.50	6.50g
Philadelphia	Red Oak	2.85/4.05	4.40/4.60	3.20/3.40	4.40/4.60
St. Louis	Mixed Oak	2.75	3.50a	3.00h	3.85ah
San Francisco	Douglas Fir	1.91ef	2.80ef	2.69ef	4.07caf

Tr.—Treated; Untr.—Untreated. a Creosoted. c Empty cell. e Green f f.o.b. cars. g 7 x 9 x 8′ 6" * Add 75¢/tie freight charge to Birmingham. *h 7" x 9" x 9½"

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb	$5.02
Chlorine cylinders, liquid, per lb. f.o.b. works	.11
Calcium chloride, 77-80%, flaked, 100-lb. paper bag, f.o.b. works, ton	31.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb	2.65
Soda ash, 58%, in paper bags, per 100 lb. dense	1.90
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works	2.05
Sulphate of copper, in bags, 99% per 100 lb. f.o.b. works	10.70

More fire insurance at no extra cost

with adequate fire protection systems

In only six years the cost of a sprinkler system in your plant can be written off in lower insurance rates. Savings resulting from a good prevention system may be used to *increase* insurance coverage. The result: double protection!

Other advantages accruing from sprinkler system installation include:

1. Maximum protection of human life
2. Reduction of fire damage
3. Insure property previously non-insurable
4. Protection of non-insurable but vital company data
5. Safeguarding of continued production

Following charts show possible savings — consult your sprinkler system contractor on how you can effect a similar saving in your plant.

Chart A

Years	1	2	3	4	5	6	7	8	9	10	Total
Premium Cost	$4000	$4000	$4000	$4000	$4000	$4000	$4000	$4000	$4000	$4000	$40,000

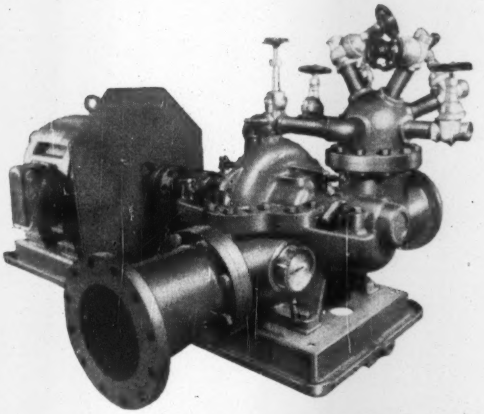
Chart A represents typical plant insurance premium cost over ten-year period *without* fire protection system.

Chart B

Years	1	2	3	4	5	6	7	8	9	10	Total
Sprinkler System Cost	$2800	$2800	$2800	$2800	$2800	$2800	Six years' savings on premiums writes off cost of system				
Premium Cost	$1200	$1200	$1200	$1200	$1200	$1200	$1200	$1200	$1200	$1200	$12,000

Chart B represents cost ($16,800) of sprinkler system in same plant and resulting lower premium rate.

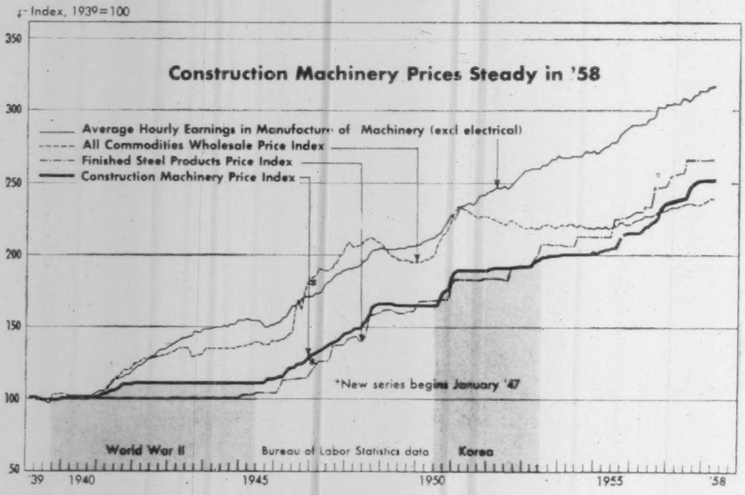
***Note* that ten years is used only for charting purposes. Savings continue for many more years.**

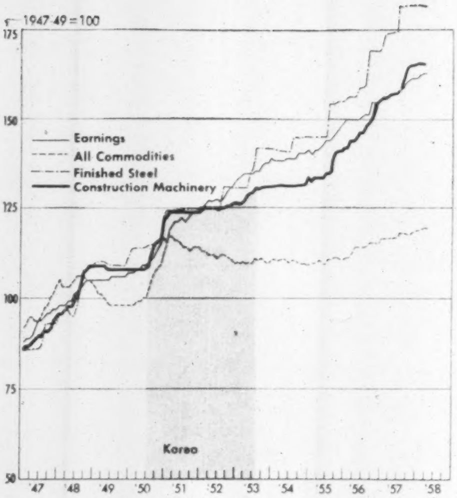


Dependable pumps are a necessary component of any fire protection system. Allis-Chalmers offers a complete line of pumps with capacities to 2500 gpm, heads to 335 feet. All models are approved by Underwriters' Laboratories and Associated Factory Mutual Companies. Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-5688





Prices Stabilize as Machinery Sales Fall

Construction Machinery Price Trend

BLS Primary Market Price Indexes, U.S. Department of Labor, 1947-49=100

	1947	1949	1950	1951	1952	1953	1954	1955	1956	Apr 1957	Apr 1958
All Types of Equipment	90.0	108.3	111.5	123.6	125.4	129.3	131.6	137.1	148.6	157.5	165.4
Cranes, Draglines, Shovels	91.0	107.5	110.8	123.5	123.9	127.8	130.9	138.1	149.1	159.2	163.2
Shovel, ½ cu yd	92.5	105.2	108.6	123.1	123.7	126.4	128.6	134.1	143.5	150.9	153.7
Shovel, ¾ cu yd	90.7	107.2	112.8	127.5	128.8	133.4	133.3	140.3	153.4	162.9	167.4
Shovel, 1-1½ cu yd	87.8	109.9	114.2	127.6	127.2	135.3	136.6	144.7	159.2	170.6	175.8
Shovel, 2-2½ cu yd	92.3	105.1	110.5	126.0	124.3	124.7	126.4	126.7	134.4	143.7	153.9
Shovel, 3-3½ cu yd	89.7	108.7	113.6	126.7	129.1	130.2	130.8	133.3	146.0	154.1	162.7
Shovel, 6 cu yd	84.5	112.2	117.0	129.8	131.7	136.7	138.8	145.4	160.9	173.2	179.5
Crane, truck mounted	90.1	108.3	112.4	126.4	126.4	131.6	133.7	141.5	154.5	161.6	164.2
Crane, tractor mounted	94.2	104.4	106.4	110.0	110.0	110.3	111.9	115.6	120.3	126.6	135.1
Bucket, clam shell	91.8	109.2	110.3	116.7	119.1	122.6	124.5	130.6	137.0	152.7	152.7
Bucket, dragline	93.1	107.4	104.0	112.6	112.6	119.2	134.9	155.4	166.6	180.8	180.8
Scrapers and Graders	89.0	108.8	112.0	128.0	128.9	129.0	129.4	133.1	142.8	150.1	158.8
Scraper, 4 Wheel, 8-10.5 cu yd	91.3	107.8	110.9	125.4	126.0	126.0	126.7	128.9	139.2	155.0	155.0
Scraper, 4 Wheel, 12-15 cu yd	94.4	104.7	107.7	127.1	126.9	124.4	124.4	126.1	134.3	142.9	151.3
Scraper, 2 Wheel, 14-18 cu yd (a)	....	....	....	....	....		....	100.0	109.2	....	122.7
Grader, heavy duty	88.2	109.2	112.3	127.1	128.6	133.0	134.8	137.8	147.6	154.9	164.0
Grader, light & medium	85.5	111.4	114.7	130.2	131.1	129.7	129.4	135.4	146.1	152.2	161.2
Tractors	87.7	110.2	113.7	125.1	128.7	136.3	140.4	145.7	160.5	169.3	180.5
Wheel-type, off-highway (a)	....	....	....	....	....	....	....	100.0	113.0	118.6	128.1
Crawler type, under 45 dhp	89.5	108.3	111.5	121.9	128.0	135.5	142.3	148.3	160.3	166.5	179.1
45-60 dhp	89.1	109.3	112.7	125.1	128.8	135.6	139.0	145.0	161.0	172.3	182.6
60-80 dhp	86.1	110.9	113.5	123.6	126.9	137.2	141.7	146.8	164.6	176.6	185.8
80-120 dhp	87.3	111.0	114.1	124.6	127.9	137.3	140.6	148.2	164.7	172.3	186.7
120 & up dhp	86.8	110.9	116.4	130.1	136.5	143.9	150.4	154.1	169.9	178.3	191.8
Machinery, Tractor Mounted	87.6	109.6	112.5	122.9	129.9	132.4	133.8	136.7	145.8	155.2	161.7
Dozer, cable control	82.7	113.0	115.2	122.6	134.2	140.2	141.4	143.0	148.5	149.0	151.6
Dozer, hydraulic control	87.2	109.8	112.6	122.9	134.0	136.8	138.9	143.3	155.2	170.6	177.3
Cable, power control unit	89.0	107.2	109.2	123.1	121.8	122.2	123.1	126.6	133.0	139.9	147.9
Loader, shovel type	91.1	108.3	111.9	123.4	124.5	125.1	125.7	127.4	136.9	146.7	153.9
Specialized Machinery	91.5	105.8	109.7	119.5	119.3	122.8	123.4	126.0	136.2	144.6	150.7
Ditcher	87.4	108.3	111.4	118.6	118.7	121.7	124.2	129.2	142.5	151.8	154.1
Roller, tandem	96.7	101.7	113.6	130.9	129.2	144.3	146.0	147.5	164.3	181.7	193.2
Roller, 3 wheels	95.6	102.9	110.1	124.8	126.9	130.8	131.4	132.0	143.3	154.8	161.6
Ripper and rooter	90.5	108.5	109.3	116.7	115.6	114.4	116.7	118.4	126.0	138.1	143.3
Dewatering pump, 10 M gph	92.1	106.7	107.0	109.7	107.7	107.8	103.8	101.4	106.1	108.1	111.7
Dewatering pump, 90 M gph	88.6	110.2	111.5	117.0	117.0	117.9	115.8	119.9	125.7	133.3	144.3
Portable Air Compressors	93.6	105.4	109.6	124.8	124.8	124.8	125.1	133.1	135.8	146.2	159.1
Capacity, 105-125 cfm	91.3	107.7	112.1	127.9	127.9	127.9	128.4	137.1	141.2	152.2	163.7
Capacity, 210 cfm	95.8	103.1	107.1	121.7	121.7	121.7	121.7	129.2	130.3	140.5	154.6
Contractors Air Tools	93.0	106.0	108.1	120.5	120.5	123.3	125.0	128.3	144.9	150.0	164.5
Paving breaker	93.0	106.0	107.8	119.7	119.7	123.6	126.0	....	144.4	149.3	164.6
Mixers, Pavers, Spreaders	92.7	107.5	108.4	118.0	118.1	121.3	122.0	127.7	135.3	142.5	149.2
Mixer, portable, 6 cu ft	92.8	105.5	108.6	120.2	120.5	123.4	124.4	130.6	137.9	144.1	151.5
Mixer, portable, 11 cu ft	93.9	105.1	110.6	125.7	124.3	127.0	127.5	137.8	146.8	151.7	160.1
Mixer, portable, 16 cu ft	93.7	105.6	108.8	120.9	121.8	125.5	127.5	138.2	146.3	153.6	163.7
Mixer, truck, 4½ cu yd	95.7	104.5	107.5	117.3	117.3	111.2	108.4	109.1	114.8	122.1	128.1
Mixer, paving, 34 cu ft	93.6	106.5	117.5	126.8	127.9	130.5	132.5	143.1	155.9	171.8	185.2
Concrete finisher and spreader	93.1	107.0	109.9	121.6	122.3	135.8	143.0	150.5	160.4	166.3	173.0
Bituminous distributor	90.2	112.9	103.9	106.7	106.7	108.3	105.0	103.9	109.6	115.9	122.4
Bituminous spreader	91.8	107.8	111.8	119.6	119.6	119.6	119.6	135.7	145.7	160.3	160.3
Bituminous paver	90.4	107.2	110.1	118.2	119.7	129.7	136.9	140.5	145.3	149.8	153.0

*a January 1955 = 100

The sharp decline in sales of construction machinery during the last eight months of '57 anchored manufacturers' prices late in the year.

U.S. Bureau of Labor Statistics index of prices (fob plant) crept up slightly after December to a record high of 165.6 in February, based on 1947-49 average prices as 100. The index backtracked in March and April to 165.4. But it was 5% above April '57.

Large inventories may have caused the March price dip in power shovels of two or two and one-half yard capacity. By contrast, power shovels of one to one and one-half yard capacity and dewatering pumps 90,000 gph rating increased slightly. All other items covered by the BLS indexes (table) were unchanged between January and April.

A new upturn in heavy construction contracts began in the first quarter and new orders for construction machinery followed the contract curve.

This change in the market may mean that if steel prices go up in July, machinery manufacturers will pass on this increase in higher prices.

Construction Equipment Cost Index, 1926=100

By Marshall & Stevens, Chicago

1914	59.2	**1926**	100.0	**1938**	82.9	**1950**	166.2
1915	61.2	**1927**	95.9	**1939**	82.4	**1951**	177.3
1916	67.5	**1928**	96.8	**1940**	83.4	**1952**	177.8
1917	88.2	**1929**	91.0	**1941**	92.0	**1953**	179.6
1918	122.6	**1930**	86.1	**1942**	100.8	**1954**	183.0
1919	129.0	**1931**	77.6	**1943**	101.3	**1955**	188.2
1920	154.4	**1932**	71.9	**1944**	101.6	**1956**	205.6
1921	119.7	**1933**	71.8	**1945**	102.5	**1957**	224.4
1922	83.5	**1934**	76.0	**1946**	124.2	**3/57**	220.4
1923	97.3	**1935**	79.7	**1947**	150.3	**9/57**	224.1
1924	107.2	**1936**	83.0	**1948**	161.1	**12/57**	230.3
1925	105.4	**1937**	87.2	**1949**	161.1	**3/58**	233.6

KEEP OUR
ROADS
ON THE GO

The Interstate Highway Program moves steadily ahead with steel

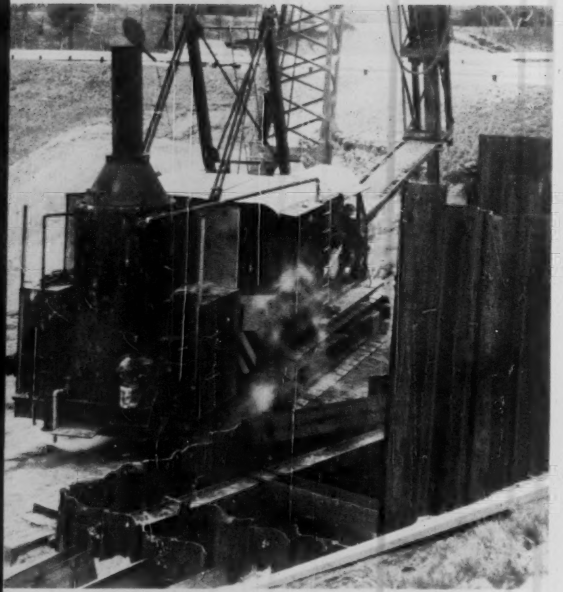
By May 1st this year, 1,454 miles of Interstate-Defense Highways had been completed, and 2,714 miles were under construction. Practically all of this construction had been authorized before July 1, 1956. On highway projects authorized since that date, preliminary engineering has started or contracts have been let on 3,519 miles, at a cost of more than 3 billion dollars. An additional 1.2 billion dollars has been committed for 2,142 miles of highway on which preliminary work is yet to begin.

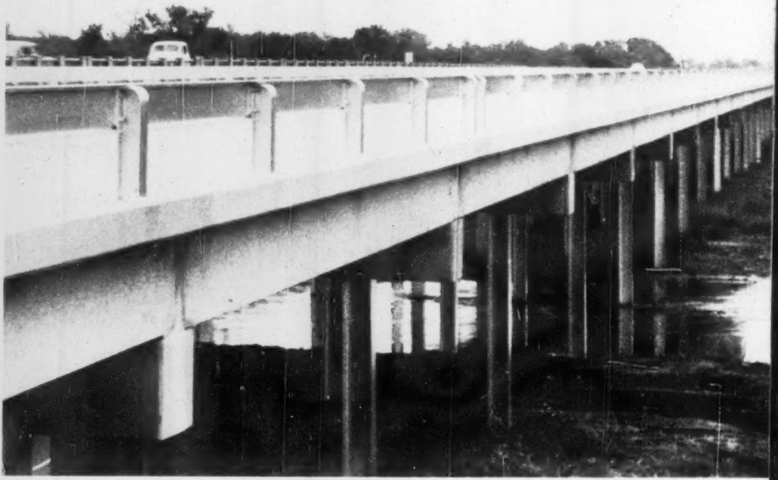
In every mile of construction now completed or underway—and in the thousands of miles of Interstate-Defense Highways still to be built—an estimated average of *500 tons of steel per mile* will speed up construction, will provide greater strength, safety and durability, and, most important of all, will keep costs down.

Its basic superiority as a structural material, its unusual versatility, and the many economies its use assures make STEEL a vital and indispensible part of the Interstate Highway Program. More than 20 million tons of steel are slated for use in this giant controlled access system. The following pages show some of the more interesting ways in which steel is being applied to keep our roads on the go.

USS

In your bridges and bridge speed up work, keep costs





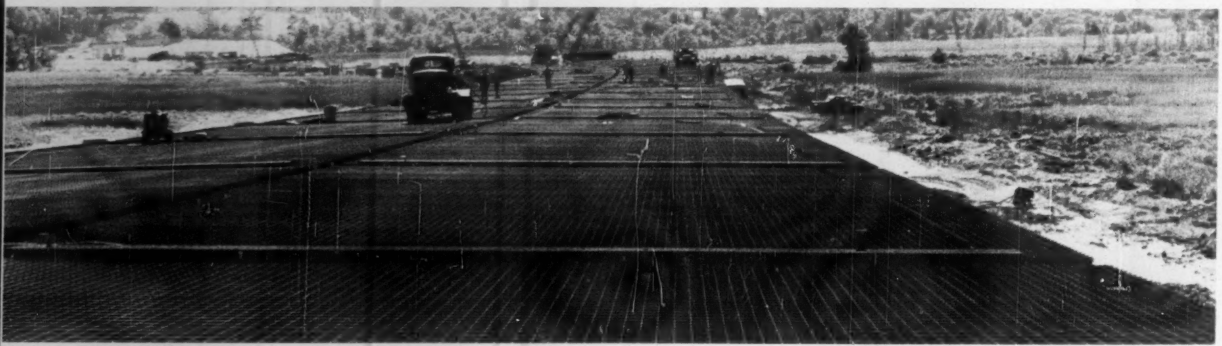
Foundation constructors depend on USS Steel Sheet Piling as the logical and economical solution to their problems of retainment of earth and water. When interlocked and driven, USS Steel Sheet Piling forms a continuous, earth-tight and virtually watertight wall for such important highway applications as cofferdams for bridge piers, retaining walls, and bridge abutments. USS Steel Sheet Piling is produced in three general types in graduated weights to meet various requirements of strength and service.

The picture above illustrates an economical and increasingly popular design of bridge or viaduct utilizing exposed Steel H-Beam Bearing Piles as trestle bent columns supporting the bridge. Such piles in soil for 37 years and more have shown virtually no loss of metal due to corrosion.

More often, Steel H-Beam Bearing Piles are the "hidden assets" of highway bridges. Out of sight, they perform the important function of furnishing stable and continuing support to the bridge foundations.

Bridge designers specify Steel H-Beam Bearing Piles for their greater capacity per pile, speedy installation, ruggedness, and versatility with respect to variations in length.

U. S. Steel also produces tubular steel piling and steel for safer bridge railings.



Viaducts can have substantially lighter flooring with USS *AmBridge I-Beam-Lok* concrete-filled flooring. The 4¼″ concrete-filled *I-Beam-Lok* flooring with a lightweight concrete aggregate and a ¾″ overfill of regular concrete weighs only 58 psf. Supporting members can be spaced 8′ to 9′ on centers and still safely provide for H-20 loadings. *I-Beam-Lok* open-type weighs only 18.8 psf.

foundations down with steel

In this bridge, the largest on the Kansas Turnpike, designers saved 500 tons of steel —and an estimated $100,000—by using USS *Tri-Ten* Steel for the more heavily stressed chords and diagonals. Because *Tri-Ten* is stronger, these parts could be made thinner and lighter. *Tri-Ten* has a yield point of 50,000 psi minimum, and it meets fully all of the requirements of ASTM Specification A-242 for high-strength low-alloy steels.

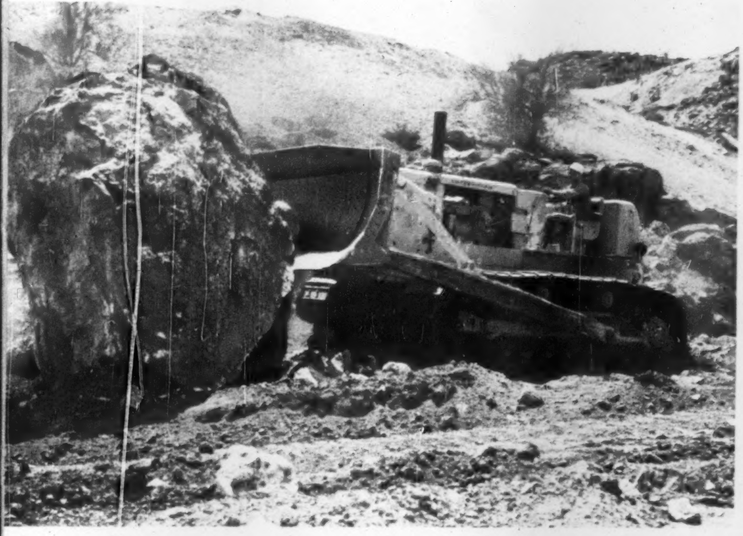
KEEP OUR
ROADS
ON THE GO

Keep your road-building

with these stronger, tougher,

Moving the estimated 41 billion cubic yards of earth necessary for the Interstate Highway System is going to wear out a lot of earth-moving equipment. Your shovels, cranes, scrapers, dozers, and graders will be able to work longer at top capacity if USS High Strength Steels or "*T-1*" Constructional Alloy Steel are used in members subject to shock loading, high stress and severe abrasion. When fitted with tough, long-lasting USS *American Tiger Brand* Wire Rope, your hoists, shovels and derricks can operate at full capacity in the toughest going.

equipment on the job
more durable steels



The moldboard takes the beating when bulldozers and graders are pushed to get work done quickly. Greater power and high speeds greatly amplify the destructive effects of impact, shock, wear and abrasion. USS *Man-Ten*, USS *Tri-Ten*, and USS "*T-1*" Steels assure longer service life for moldboards. Each of these steels has individual characteristics, but all have the ability to withstand the gaff of heavy-duty operation.

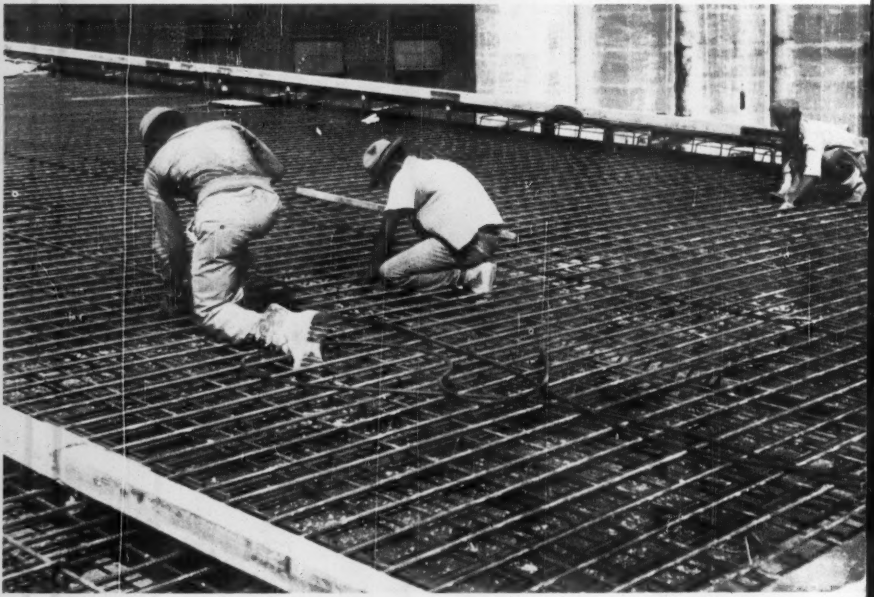
Modern earth-moving machinery must operate at top capacity and high speeds to pay its way. Under these circumstances, it is subject to great stress as well as shock and abrasive wear. USS "*T-1*" is the ideal constructional alloy steel to withstand the ruinous effects of these conditions. It imparts high strength in addition to fatigue and impact-abrasion resistance to parts that take a beating.

KEEP OUR
ROADS
ON THE GO

To stand the gaff of your roadways need the

Many of the 41,000 miles of new Interstate highways will be paved with *Universal* or *Atlas* Cements, made by Universal Atlas Cement Company, subsidiary of United States Steel. For example, *Atlas Duraplastic* air-entraining portland cement will give you a concrete mix that is extremely workable, more plastic, more cohesive, more uniform. It places, spreads and finishes easily, allowing finishers to work closely behind the paving machines.

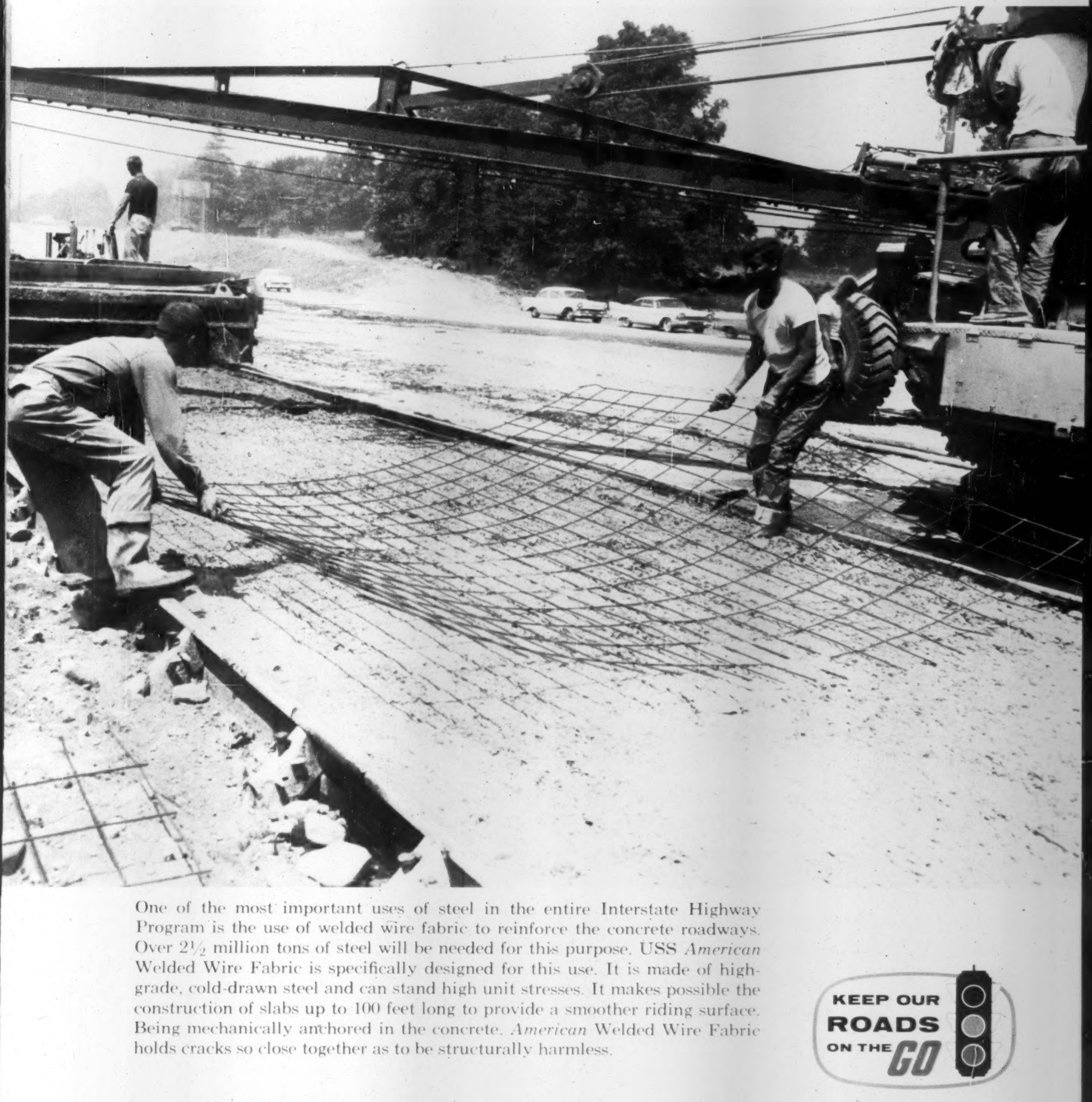
USS Blast Furnace Slag, used extensively as base and subbase material for pavements, is also used in the manufacture of cement. Blast Furnace Slag is light in weight compared with other aggregates and yields more concrete per ton.



Piers, bridges and viaducts require special reinforcement of steel to assure strength and permanence. More than $3\frac{1}{2}$ million tons of concrete reinforcing bars are expected to be used in the Interstate Highway System. USS *Di-Lok* Reinforcing Bars are designed to produce better reinforced concrete at lower cost. *Di-Lok* Bars have a continuous *diamond-locking* deformation that provides positive anchorage, inhibiting longitudinal movement of the bars and strengthening the bond between concrete and steel. You build better and faster with USS *Di-Lok* Reinforcing Bars.

American Transverse Road Joint Load Transfer Assemblies save much working time since they are shipped to the job completely assembled. Strength of supporting members assures proper alignment of every dowel during operation.

high-speed traffic
added strength of steel

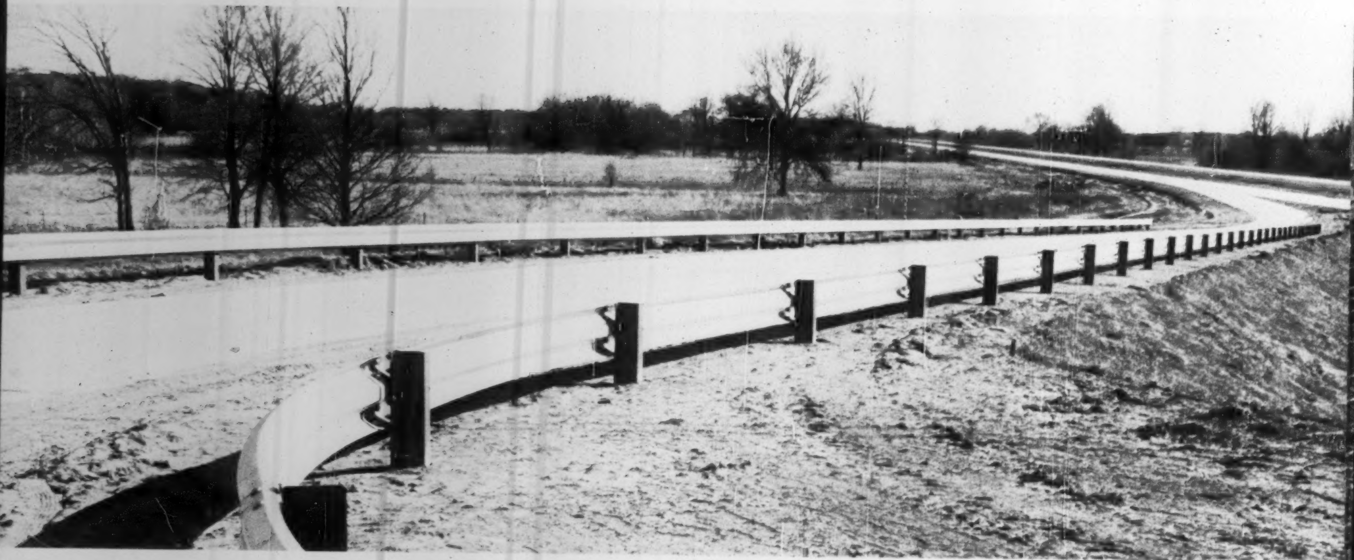


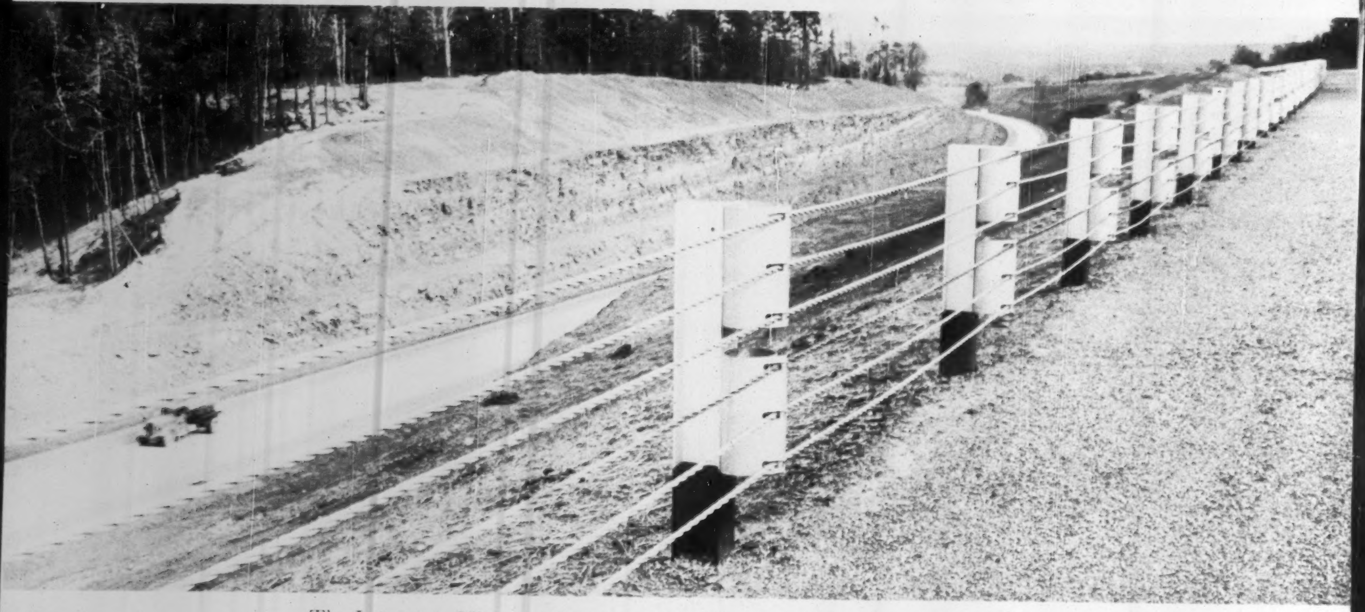
One of the most important uses of steel in the entire Interstate Highway Program is the use of welded wire fabric to reinforce the concrete roadways. Over 2½ million tons of steel will be needed for this purpose. USS *American* Welded Wire Fabric is specifically designed for this use. It is made of high-grade, cold-drawn steel and can stand high unit stresses. It makes possible the construction of slabs up to 100 feet long to provide a smoother riding surface. Being mechanically anchored in the concrete, *American* Welded Wire Fabric holds cracks so close together as to be structurally harmless.

KEEP OUR
ROADS
ON THE GO

Fast-moving traffic needs the

# of these highway safeguards

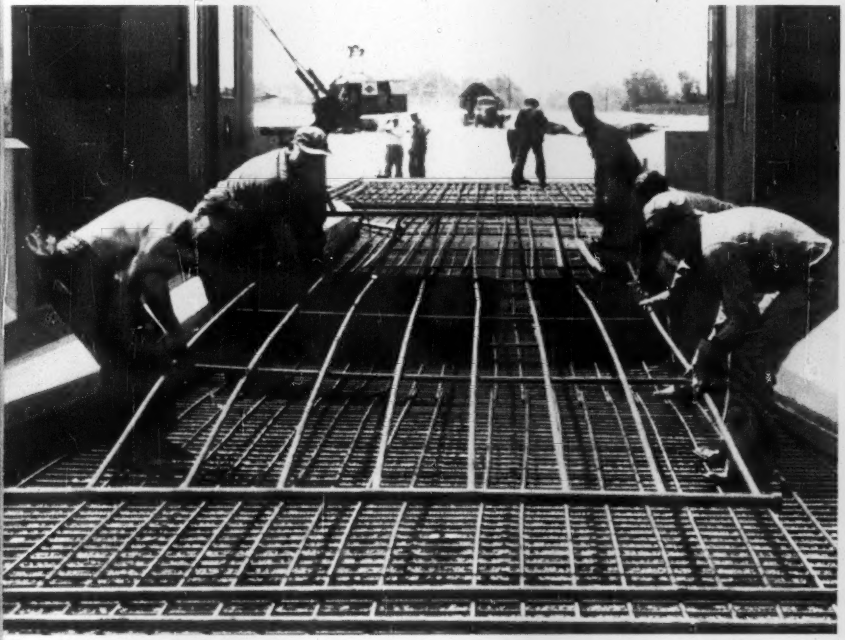




The Interstate Highway System will incorporate all practical safeguards to eliminate travel hazards. USS *American* Highway Beam Guardrails combine controlled flexibility, high visibility and negligible maintenance. Also available in 11 western states is the *Western* Highway Guardrail, made by United States Steel's Consolidated Western Steel Division. American Steel & Wire Division manufactures *Multisafty* Cable Highway Guard of steel strands that will withstand 25,000 lbs. tension each, for use with either steel or pressure-creosoted wood guardrail posts.

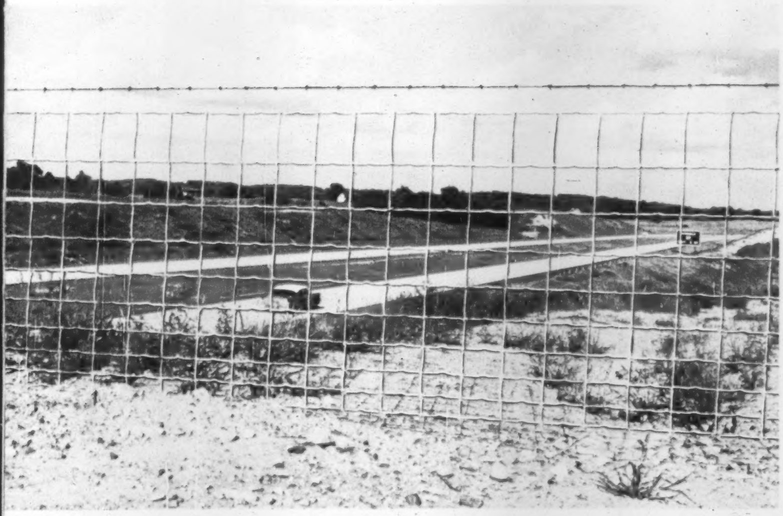
USS

protection made of steel



Critical areas in the highways of tomorrow can be made safer with snow-melting systems made of *National* Pipe. In terminals, service areas, interchanges, accelerating and decelerating lanes, and bridge floors, *National* Steel Pipe can provide long, long life for such a modern safety feature.

The *Atlas* White Concrete Reflecting Curb has a saw-tooth face which reflects headlight beams back to the driver and makes road boundaries readily visible on clear nights . . . even more brightly visible on rainy nights. Roadways at nighttime are safely lined with a ribbon of white light. Pioneered by Universal Atlas Cement Company.



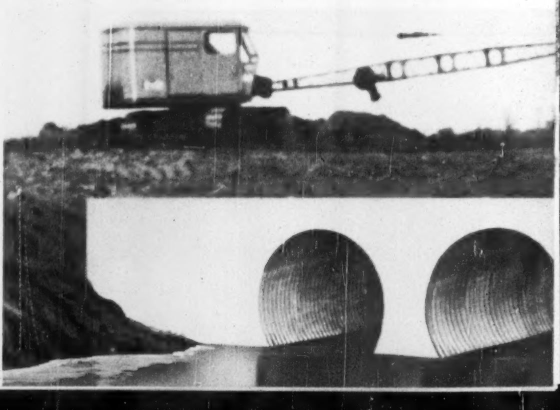
Forty-one thousand miles of right-of-ways must be protected for the safety of both the motorist and those who live, work and play in areas adjacent to the Interstate Highway System. Such a job is ideal for USS *American* Fence or for one of the several types of *Cyclone* Chain Link Fence. In rural areas, more *American* Fence is in use than any other brand. To prevent unauthorized entry to garage and service areas, *Cyclone* Invincible Fence topped with three strands of barbed wire is completely effective.

KEEP OUR ROADS ON THE GO

Wherever drainage is
save time and

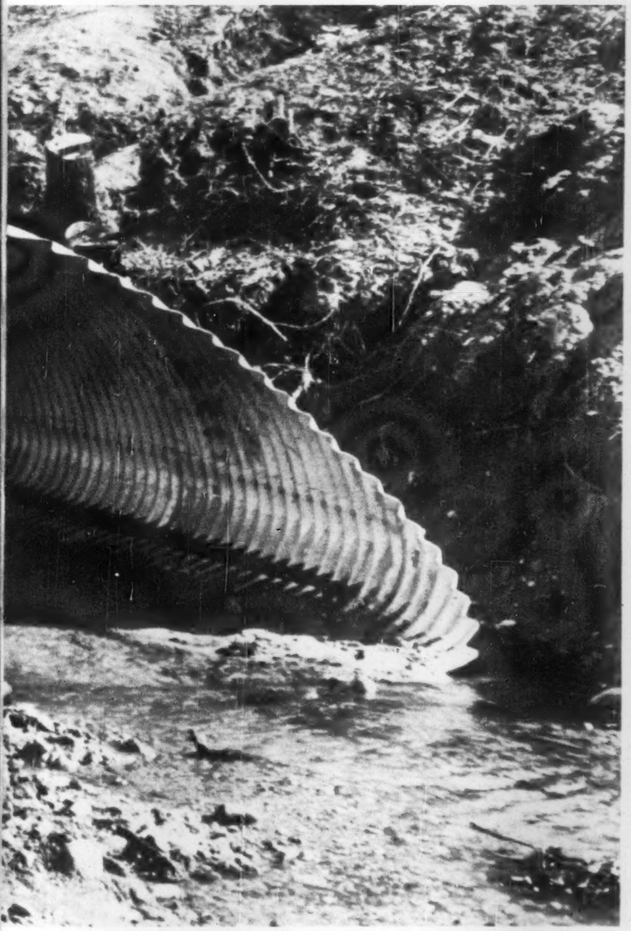
The construction of large drainage structures which will last indefinitely with minimum maintenance is rapid, easy, and economical with USS *AmBridge* Sectional Plate, available in Pipe, Pipe-Arch and Arch Sections in a wide range of sizes and gages. All of the lightweight *AmBridge* Sectional Plate for a complete structure can be nested for shipping on one truck. Field assembly is fast with ordinary labor and without the need of special hoisting equipment.

Many drainage problems on the Interstate Highway System can be solved most practically with the use of corrugated metal drainage products fabricated from USS Culvert Sheets. Strength, low cost, ease of handling and speed of installation especially recommend their use.

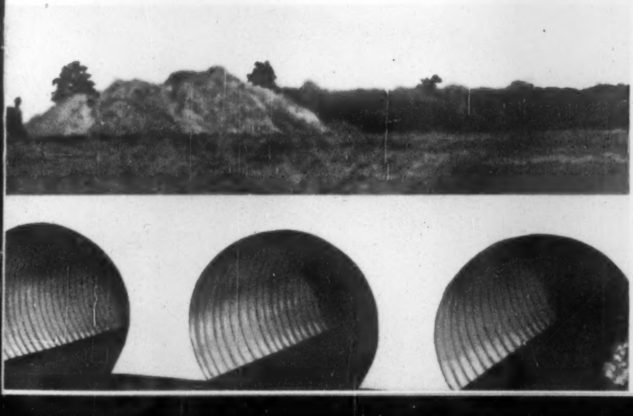


USS

a problem
money with steel



Concrete pipe reinforced with USS *American* Welded Wire Fabric will be used in many drainage structures in the Federal Highway Program. The quality of the cold-drawn steel wire, the dependability of the welds and the accuracy of the spacing provide maximum reinforcement and add to the permanence of the installation.



KEEP OUR
ROADS
ON THE GO

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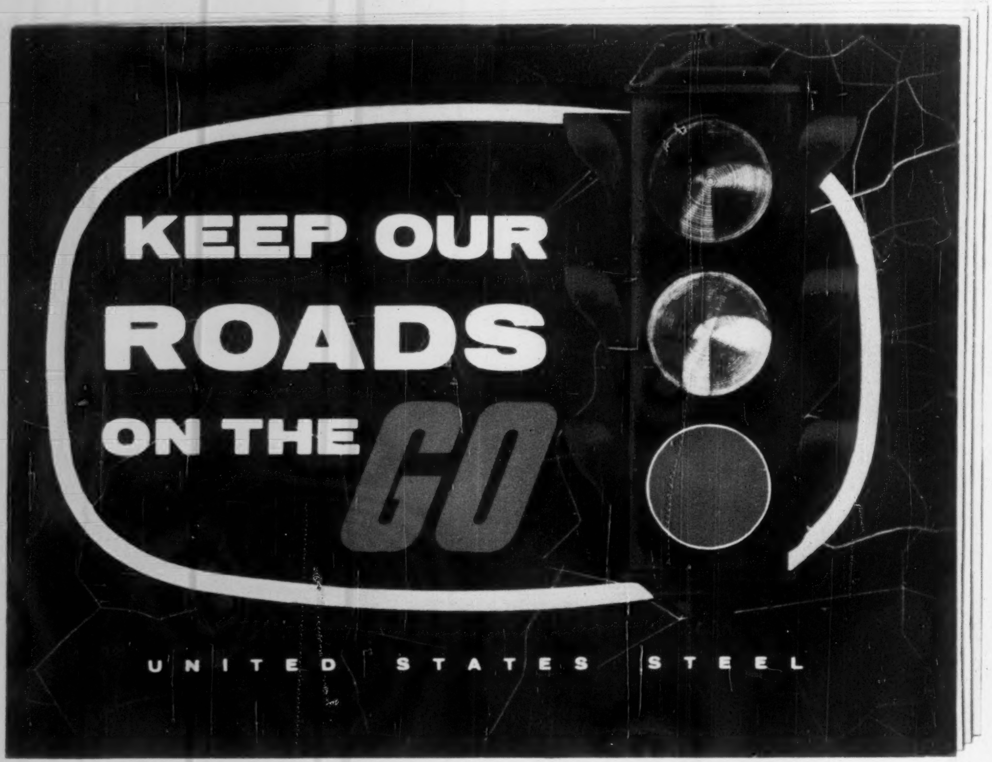

It lists all the products and services that United States Steel offers to those concerned with designing and constructing highways and highway building equipment. It can give you many ideas for cutting costs, speeding construction, and making a more serviceable road. We will gladly send it to you without charge. Write to United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

Be sure to see "The Five Mile Dream,"

a color motion picture which dramatizes the story of the building of the Mackinac Bridge. It is narrated by Lowell Thomas, CBS radio and television star. You'll enjoy this exciting battle against time and nature. Don't miss it when it plays at your local movie theater.

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Printed in U. S. A.

Better Lighting Needed, Study Shows

Lots more light per work space will be needed if new recommendations for evaluating lighting levels are followed.

A re-evaluation of lighting practices is being compiled for publication in a revised edition of the Illuminating Engineering Society's lighting handbook, to be released in January, 1959. The new practices are based on an eight-year study conducted at the Vision Research Laboratories, of the University of Michigan, under direction of H. Richard Blackwell.

Here are some examples of the changes recommended:

- For an accountant's desk, an increase in foot-candles from the presently recommended 50 to a minimum of 150.
- For a draftsman's work area a fourfold increase from 50 to 200 ft-c.
- For school rooms, which involve writing with soft-lead pencils, an increase from 30 to 60 ft-c.
- In the garment industry an even greater need for foot-candle step-up is indicated. To handle such tasks as viewing orange chalk markings on brown tweed, for example, the new system shows a required 266 ft-c level, compared to the present recommendation of 40 ft-c.

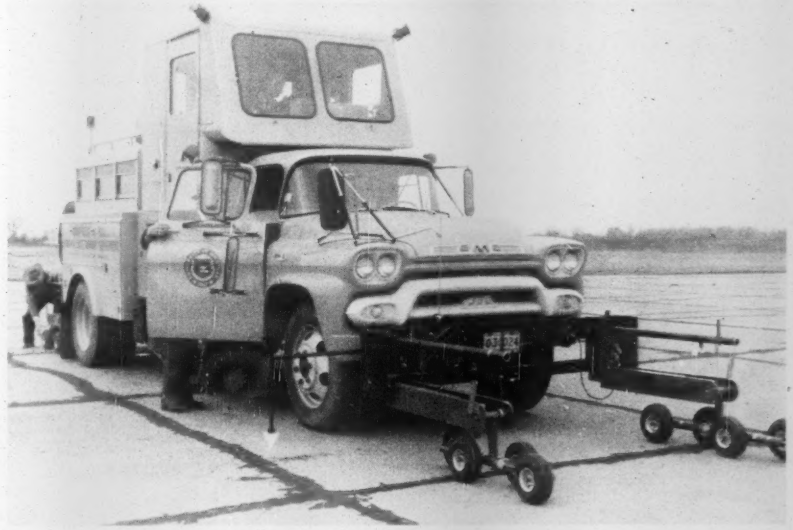
Researchers tried to establish how accurately individuals could see discs of varying sizes for varying periods. Targets were designed to simulate various degrees of difficulty in seeing objects under varying conditions. Thousands of readings were recorded.

While conducting the study, Mr. Blackwell recognized that the average eye sees or "assimilates" visual information by bits, and that the level of lighting determines the number of assimilations the eye can make in a given time interval. "The average eye is capable of making 10 such assimilations a second if the light level is sufficiently high," he said.

"The number of assimilations per second determines the amount of information the eye has absorbed, and the more information the eye has absorbed, the higher the rate of performance of the observer is likely to be." (The IES has adopted five assimilations per second as a reasonable average level of desired performance.)

The test data became the cornerstone of a system based on this fact: identical light levels are required to perform visual tasks of equal difficulty. Thus, Mr. Blackwell explains, "If the lighting engineer knows the amount of light required to perform a given visual task, he can accurately specify the amount of light required by another task equally difficult to see."

To relate his basic data to any seeing task, Mr. Blackwell developed an optical instrument called the Visual Task Evaluator. With this device, you can view a seeing task of unknown lighting requirements at threshold—or just bare visibility—match it to a test object of known lighting requirements. Then you quickly determine the lighting requirements from the collected statistical data.



Truck's Outriggers Check Road

The Michigan State Department is currently studying, in minute detail, every square inch of some 9,300 miles of its trunk-line roads. Ultimate purpose of the study, says Highway Commissioner John C. Mackie, "is to provide the most economical highway service possible through elimination of all inadequate highways in the state."

The highway department is now profiling and photographing the entire surface of the designated roads. Heart of this extensive operation is a specially designed truck. It contains two cabs, quarters for the crew, myriad recording devices and 18 extra wheels. The vehicle can detect pavement irregularities as small as $\frac{1}{32}$ in. It travels at 4 to 5 mph. Irregularities are recorded on graphs that are used to correlate the effects on roads of variations in soil conditions, drainage, construction techniques and local weather conditions.

Furthermore, analysis of the data will make it possible to determine the relative importance of these factors, compared to the effects of traffic loads.

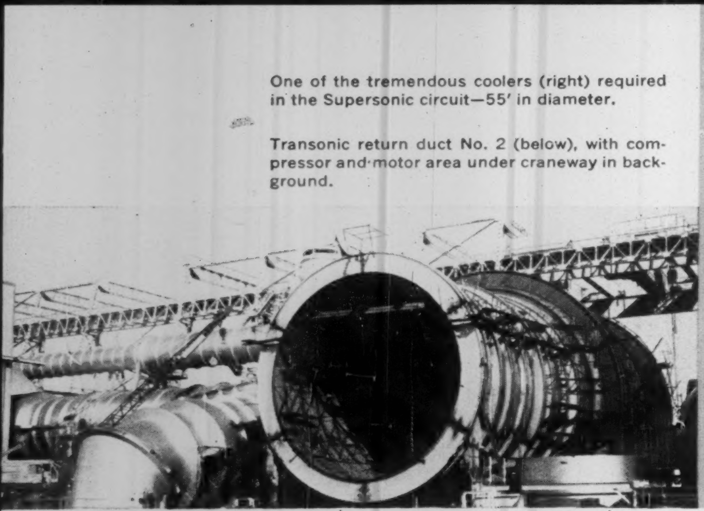
To obtain the desired information, the truck is equipped to measure and record the general profile of a road, the total pavement irregularities per mile, and the roll of the pavement—that is, the difference in elevation between the wheel tracks.

To permit visual inspection of the road surface, a camera mounted at the rear of the truck photographs each and every slab passed over.

Director of the study, Professor William Housel of the University of Michigan, expects, that by correlating the data obtained, it will be possible to make important improvements in road design criteria, as well as to uncover trouble spots before they develop.

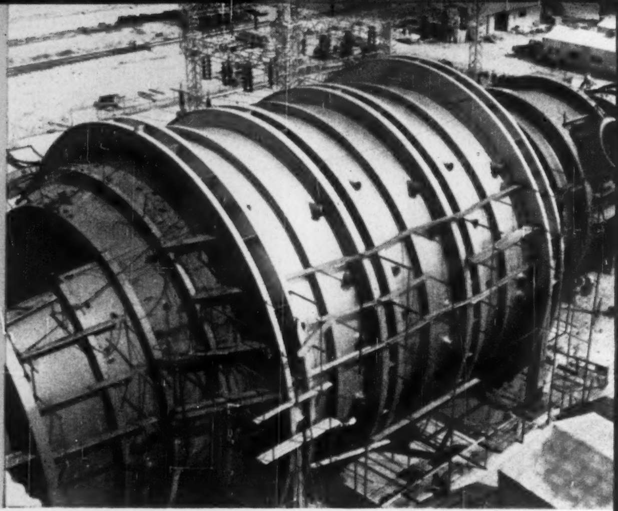
The study is being conducted by the University of Michigan, under grants from the Michigan Trucking Association, the American Trucking Association, and the Automobile Manufacturers Association.

(*Research continued on page 117*)

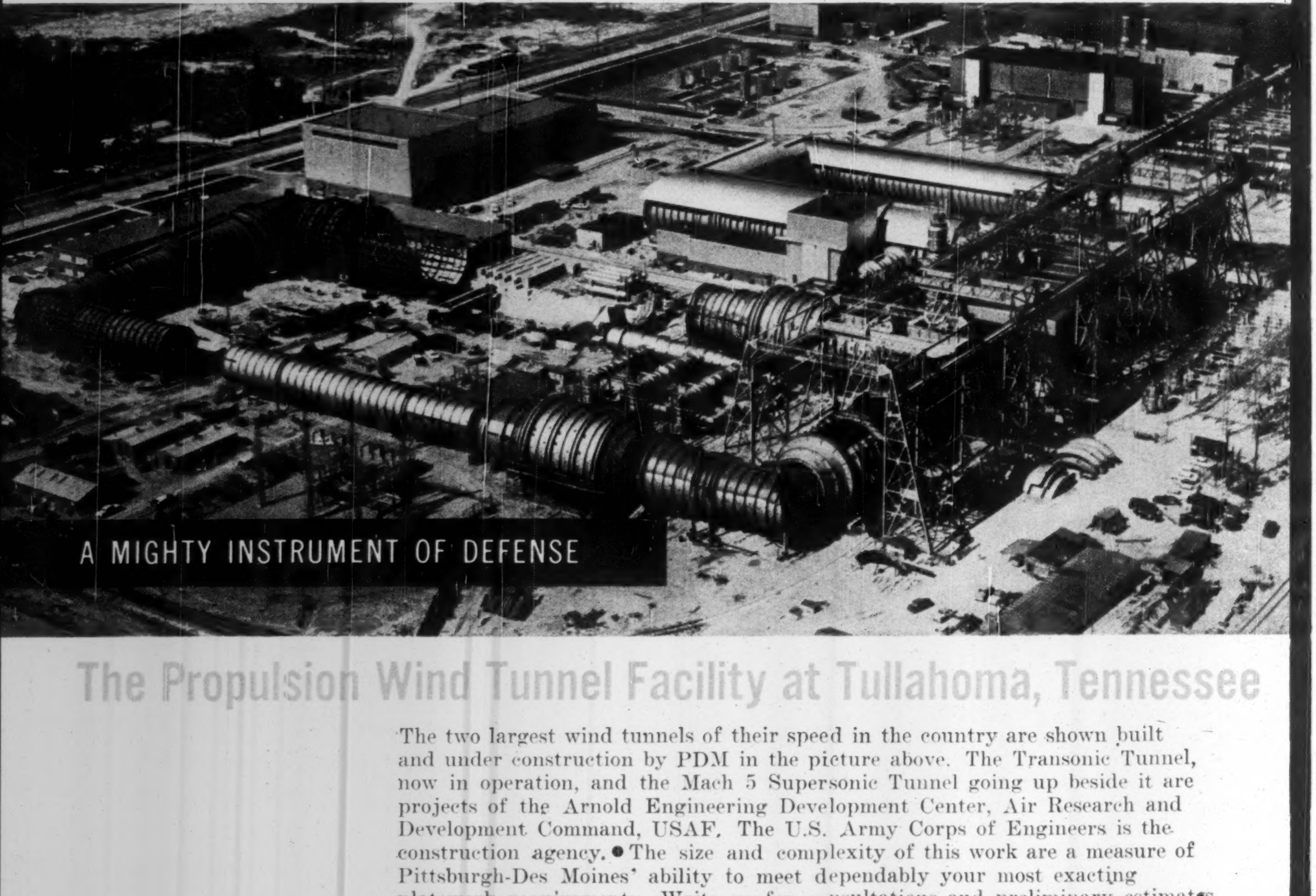


One of the tremendous coolers (right) required in the Supersonic circuit—55′ in diameter.

Transonic return duct No. 2 (below), with compressor and motor area under craneway in background.



Steel Platework by **Pittsburgh-Des Moines**



The Propulsion Wind Tunnel Facility at Tullahoma, Tennessee

The two largest wind tunnels of their speed in the country are shown built and under construction by PDM in the picture above. The Transonic Tunnel, now in operation, and the Mach 5 Supersonic Tunnel going up beside it are projects of the Arnold Engineering Development Center, Air Research and Development Command, USAF. The U.S. Army Corps of Engineers is the construction agency. ● The size and complexity of this work are a measure of Pittsburgh-Des Moines' ability to meet dependably your most exacting platework requirements. Write us for consultations and preliminary estimates on your forthcoming projects.

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New York Reports

City points the way to some aeration answers

New York City's research into sewage treatment continued full blown in 1957. Among the projects reported in the annual report of the Department of Public Works were:

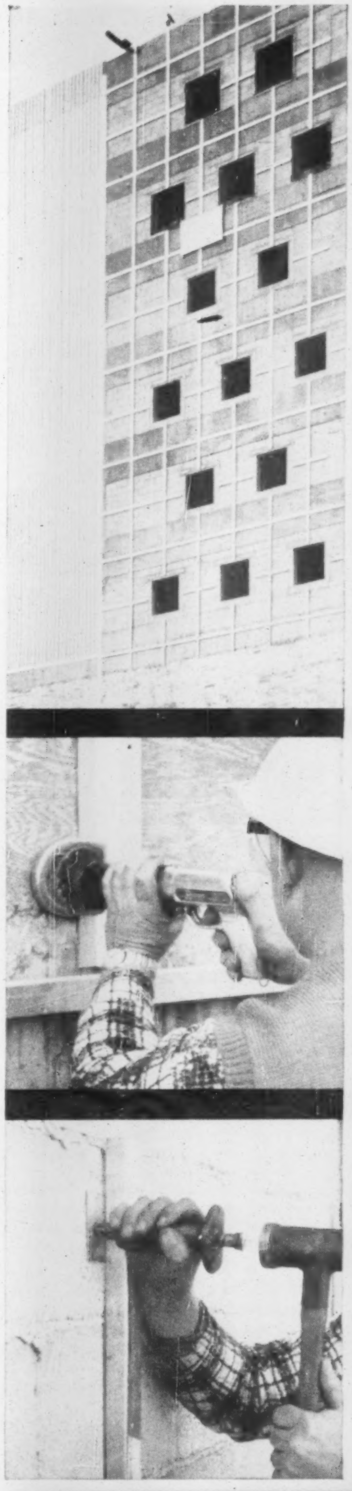
- **Short period aeration**—At the city's Owl's Head treatment plant, a year-long plant-scale test of short period modified aeration was successfully completed. Aeration time was reduced to 33 minutes, the air ratio cut to 0.24 and the sludge age held to 0.2 days in treating 85 mgd.

  The plant outflow during the test contained 59 ppm suspended solids and 75 ppm BOD. In comparison, during the four previous years when the aeration period was 2.2 hours and the air ratio 0.47, the plant outflow contained 46 ppm of suspended solids and 67 ppm BOD. The test showed a substantial degree of treatment can be obtained at higher aeration tank loadings than previously attempted with accompanying decreases in compressed air requirements.

- **Diffusion tube clogging**—Clogging of plastic-wound air diffusion tubes, under study for two years, was found to be caused by fine sand lodging in the windings at the Rockaway plant and by contamination of the air supply by soot and tars at the Hunts Point plant. In a similar test of adjacent headers of plastic-wound and ceramic tubes at the Owl's Head plant, the plastic wound tubes clogged after passing about 2 million cu ft of air. The ceramic tubes continued to pass air without any appreciable increase in pressure. As a result of the tests, a new plastic winding has been developed.

- **Aerator frothing**—Improved control over aeration tank frothing caused by detergents has been obtained with low pressure spraying systems. Large orifice, flooding-type nozzles apply 0.5 ppm of returned final effluent per linear ft of aeration tank width. In a full scale test, the low pressure spraying system will replace the defoamers and high pressure sprays that have proved ineffective.

- **Regulator bypassing**—There's another study on ways to reduce the quantity of sewage bypassed into the harbors during rains. Recording devices were installed on large interceptors to record the incidence and duration of combined sewage overflows. Some regulators were



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RUBBER-ASPHALT JOINT SEAL compound available in both hot-pour and cold-applied types. SEALTIGHT Hot-Pour Rubber-Asphalt meets Federal Specifications SS-S-164 and CAA Specification P-605 . . . SEALTIGHT Cold-Applied Rubber-Asphalt meets Federal Specification SS-S-159 and CAA Specification P-615. Both are ideal for use in the joints of concrete streets, highways, bridges, etc.

JFR RUBBER-ASPHALT JOINT SEAL is recommended for sealing concrete runways where resistance to jet fuel is necessary. Available in Hot-Pour Type to meet Federal Specification SS-S-00167 and Cold-Applied Type that meets Federal Specification SS-S-00170. Easy and economical to apply.

TONGUE AND GROOVE Joint, used primarily as a longitudinal joint, provides a "keyed joint" that assures maximum efficiency in load transmission . . . helps to prevent blow-ups, spalling and controls cracking. Completely waterproof . . . produced from asphalt hardboard . . . is rigid, easy to handle and install, will not extrude. More economical and safer than steel center strips and will not rust away. Approved by Federal, State and Local engineering authorities.

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found to be bypassing more frequently than others. Investigation showed collapsed sewers and faulty mechanisms were the cause.

William A. O'Leary heads up the division of sewage disposal under Public Works Commissioner Frederick H. Zurmuhlen.

Ice-Damage Preventer

Researchers develop heat exchanger to eliminate winter ice around piers

Two research engineers have invented a device that could save millions of dollars annually by preventing ice damage to piers, wharves and ships during winter months. They have developed a heat exchanger that, during this last winter's test, completely eliminated ice around a 62 ft long, 12 ft wide pier at Lake Geneva, Wis.

The two men, George E. Gross and William F. Cramer, Jr., both at Armour Research Foundation of Illinois Institute of Technology, expect to manufacture the device shortly with prices starting at around $200 for the smallest model.

According to the inventors, the unit is inexpensive, portable and can't be damaged in normal use. Initial cost would vary with the size of pier and with the amount of protection needed, with a unit like the one built for the Lake Geneva pier costing about $500 initially and another $16 a year to operate. Maintenance costs also should be low, say the engineers.

During the winter's test, they found that the water stayed at around 35, even though the coldest air temperature reached to −25 F. With slight adjustment, they were able to raise the water temperature to 37 F, and they believe it possible to go as high as 40 F by using their equipment.

The two men point out that experiments indicate such a device would be feasible for keeping Great Lakes locks open year round. In fact, it is conceivable, they say, that entire ports and shipping lanes could be kept open in normally ice-bound areas, given additional development and research.

The principle of the exchanger lies in its getting heat from the ground and the water and upsetting the stratification of water to prevent ice from forming. An added feature of the device is in its ability to regulate the direction of effective action. This facility makes it possible to melt nearly any pattern that is needed in the ice, assuring extreme flexibility.

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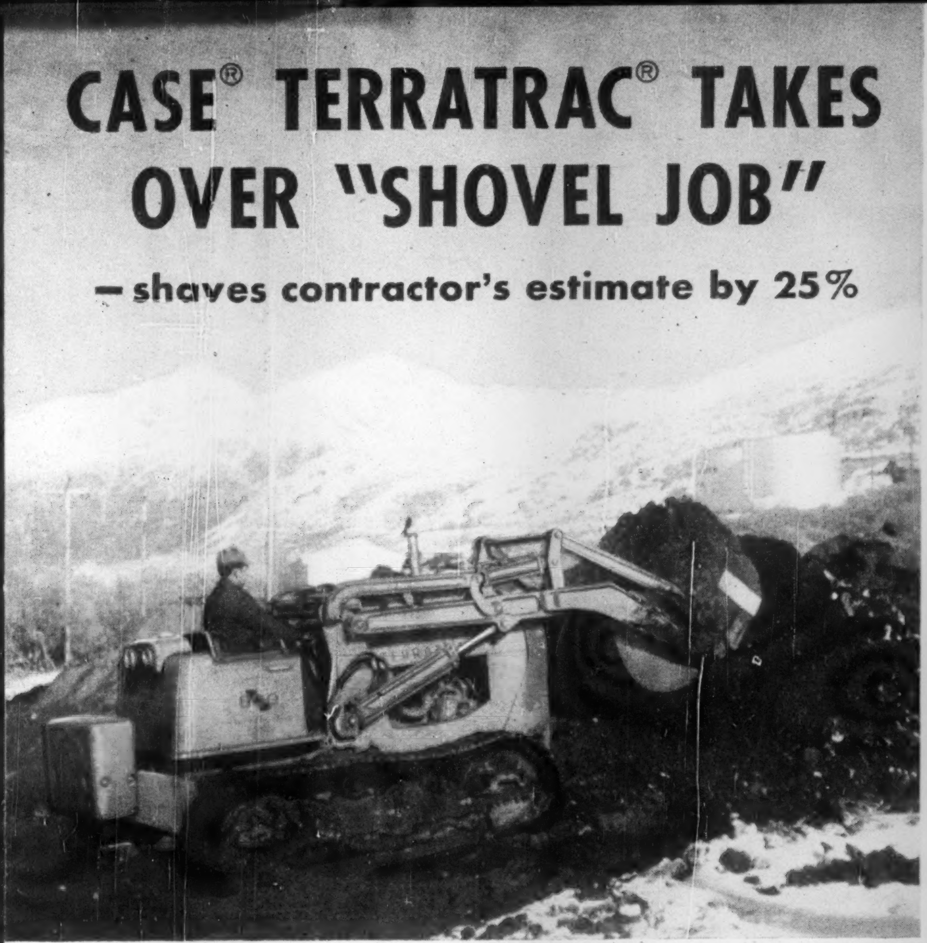
—shaves contractor's estimate by 25%



TerraTrac's maneuverability, and long forward reach proved advantageous in loading out trucks in double-quick time.

Finger-tip, hydraulic control of tractor and front-hinged bucket enabled Harrison & Moore to complete finish-grading ahead of schedule.

Carving residential sites out of Utah's Wasatch Mountain foot-hills in the dead of winter was *no easy task.* Ground was frozen and filled with stones up to 12″ diameter. Specifications called for a *smooth job — in a hurry* — including basement excavations, backfilling, lot-grading and leveling.

First machine to try it was a heavy-duty *conventional* crawler-loader but the owner quickly backed out, saying it was strictly a "shovel job". However, things began to happen when *Harrison & Moore,* land development and house building contractors of Salt Lake City, moved in with their 1½-cu. yd. Case TerraTrac "800". *Harrison & Moore not only finished the job entirely satisfactorily, but shaved 25% off the general contractor's estimated time.*

No track slippage — No engine stalling

Detachable grousers, combined with power-application benefits of torque-converter drive, enabled the smooth-running TerraTrac to break through frost and rocks with ease. TerraTrac grousers, which bolt on street shoes in 10 minutes with hand wrench, eliminated all track slippage, while the 80 HP diesel, with torque converter and foot-throttle control, provided the *steady power* needed to handle this tough digging assignment without engine stalling — even under the adverse grade conditions encountered.

According to partner "Arv" Harrison, TerraTrac's exclusive power-shift transmission and hydraulic power-steering were also major factors in maintaining production. Says Harrison, *"The speed and handling ease of the '800' — especially the hydraulic finger-tip shifting from one speed to another and from forward to reverse, while on the fly — is incomparable."*

Why not get *these same money-making TerraTrac advantages on your jobs RIGHT NOW.* Call your nearest Case Industrial Dealer today for full details on the size rig best suited to your needs. Also ask about the new Case financing and LEASE plans — which let you buy or rent these *new* advance-design Case TerraTrac machines *on easy monthly terms* to fit your budget.

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Houston bank building shows that . . .

High-Frequency Lighting Cuts Costs

By R. D. Burnham
Hi-Frequency Systems, Inc.
Vermilion, Ohio

Better lighting at lower cost—that's what the architects of the Federal Reserve Bank, Houston, achieved when they planned a high-frequency lighting system for the new three-story windowless building.

Though high-frequency lighting is not a new development (about 60 such systems are now installed in industrial and commercial buildings), the bank is one of the first and largest buildings of its kind to have a 100% high-frequency lighting system.

The general lighting is supplied from seven 30 kva, 600 volt, 840 cycle permanent-magnet generators. These units are automatically paralleled as lighting load increases, and are so matched that they may be tied directly together without synchronization. This arrangement permits the use of lower cost standard induction motors and eliminates the need for employing elaborate control equipment.

The lighting is nearly all fluorescent except for a few high-frequency incandescent fixtures, which contain two 300 volt lamps in series. Several thousand 8 ft slimline lamps are the principal light source; they can set in luminous ceilings and troffers.

• **Cutting costs**—For the Federal Reserve Building a sequence-start circuit was developed; one lamp in a fixture starts and then the other. The two lamps operate in series, thereby cutting the power correction factor in half and reducing other losses.

One of the major advantages of the high-cycle lighting was the reduction of ballast size and weight. Two small capacitors in one "can" replaced the heavy conventional two-lamp ballast. The capacitor cost less, too, and makes almost no noise.

Since the power loss in the high-frequency capacitor (and consequent heat gain in the building) is only two watts as compared to 28 watts for the common 60 cycle ballast, the capacity of the air-conditioning system in the bank building could be reduced. The estimated initial savings alone was more than $10,000.

Due to the higher distribution voltage, 600 volts, line losses are smaller and fewer circuits are required, thus cutting wiring costs.

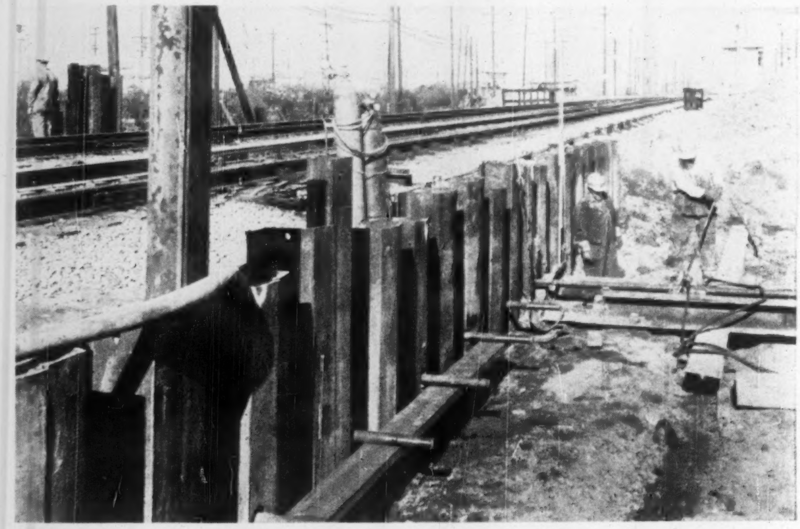
Tests have shown that fluorescent lamps work more efficiently at frequencies above 60 cycles; they produce 3% to 25% more light per lamp for the same wattage, and have increased lamp life, probably 10% to 20% at frequencies above 400 cycles. (Below 350 cycles, fluorescent lamps cannot maintain cathode ionization. Their flicker then is similar to the incandescent lamp when operated at 25 cycles.)

The cost of fixtures for the high-frequency lighting was less than for standard frequencies, since lamp brightness meant fewer fixtures for an area, and reduced ballast size meant lighter fixtures.

Electrical bids for the Federal Reserve Bank with high-frequency lighting were well below the original estimates based on the conventional 60 cycle system.

Generally, overall cost is about the same or less for small high-frequency systems as for 60 cycle systems. With large installations there can be material initial savings on the former.

Architect of the bank was Goleman & Rolfe of Houston, Texas. The high-frequency lighting system was designed by R. D. Burnham when associated with the firm of R. D. Burnham & Associates, Lorain, Ohio.



HYDRAULIC PIPE PUSHER drives steel rods through track roadbed.

Piles and Rods Hold Roadbed in Place

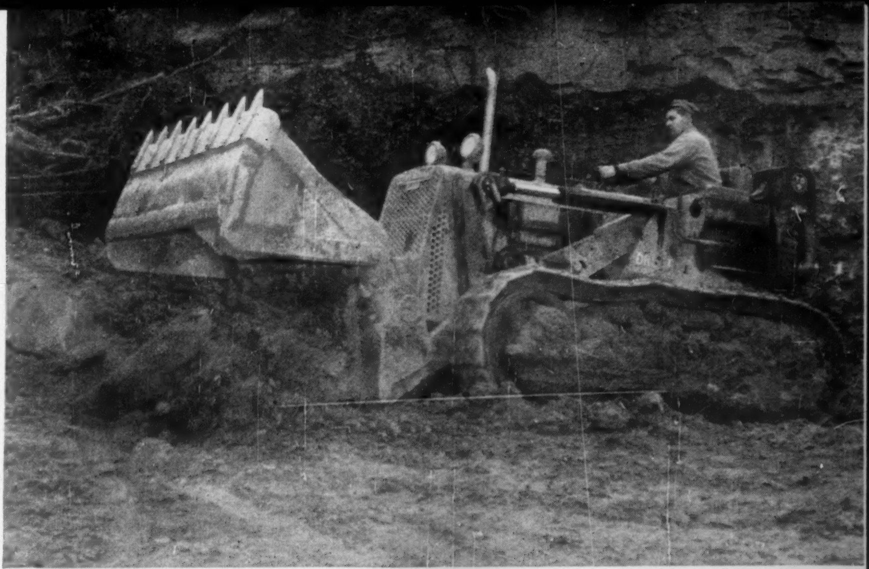
Slender rods of steel were pushed through the roadbed of a 100 ft stretch of Southern Pacific railroad track, at Burbank, Calif., to brace sheetpile walls on each side of the track. The steel Z sheetpiles were driven 40 to 48 ft into the earth on each side of the roadbed to shore up the track while flood control channel facilities are being constructed.

To hold the sheetpile vertical, two rows of 2¾ in. and 3 in. dia steel rods were passed through field-cut holes in the piles and driven about 40 ft through the roadbed by a 30 ton hydraulic pipe pusher. When the rods reached the facing piles, their positions were determined and holes were cut to let the rods through. Bolts on the threaded ends of the rods completed the load-bearing cradle. The job was done by Oberg Construction Co.; rods were by Bethlehem Pacific Coast Steel Corp.

(*Field & Office continued on page 126*)

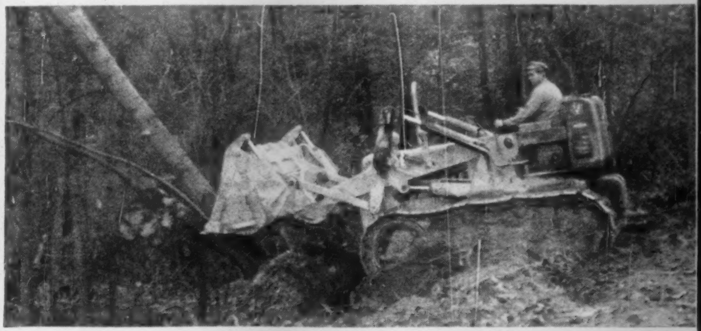
Replaces power shovel with 4-In-1

...gets versatility unlimited!

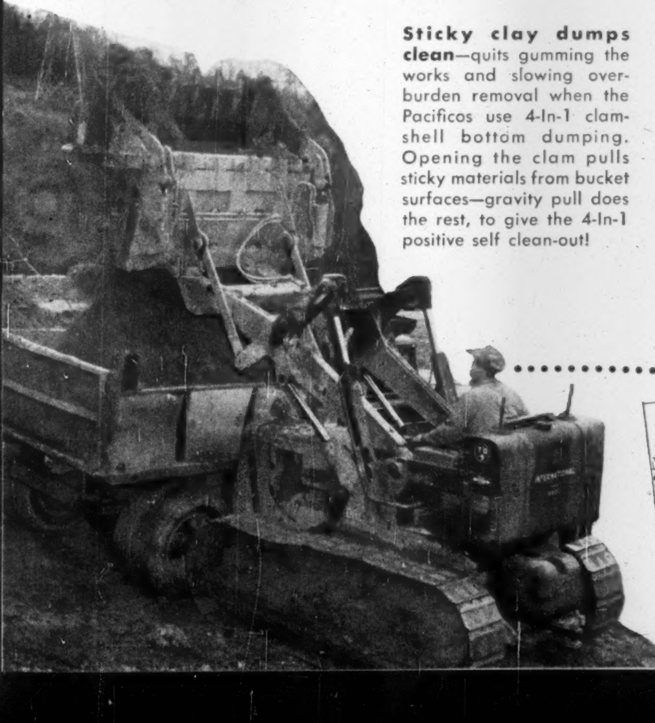


Digging, 'dozing, clearing, loading—this International Drott TD-9 4-In-1 replaces the limited-duty performance of a ⅜ cu. yd. power shovel. Tony Pacifico Company, Charleston, W. Va., practically builds a 100-ton-per-hour stone-quarrying operation around 4-In-1 versatility. Above, using bulldozer action, the 4-In-1 is removing overburden from a 60-foot-thick rock stratum. Owner formerly had to hire a dozer in addition to the power shovel to clear and strip!

Using a back-drag motion of the clam lip, with high-reaching 4-In-1 clamshell action, the Pacificos do a fast, low-cost job of bank-sloping—to forestall earth slides into the quarry. The exclusive, big-capacity clamshell also gives speedy "stand-and-fill" action of loose materials.



Pushing over a hardwood sapling, the Pacifico 4-In-1 is used for land-clearing ahead of stripping quarry overburden. For uprooting larger trees, a grubber blade can replace the 4-In-1 bucket—to apply the tremendous lifting power of exclusive Drott pry-over-shoe break-out action!



Sticky clay dumps clean—quits gumming the works and slowing overburden removal when the Pacificos use 4-In-1 clamshell bottom dumping. Opening the clam pulls sticky materials from bucket surfaces—gravity pull does the rest, to give the 4-In-1 positive self clean-out!

Prove 4-In-1 four-machine versatility unlimited! Move the machine-selector lever — try the built-in *clamshell, "carry-type" scraper, bulldozer and Skid-Shovel* actions. Compare exclusive pry-over-shoe break-out action for digging hard materials other rigs can't budge! See how exclusive Hydro-Spring swallows shock, protects performance. Ask your International Drott Distributor for a 4-In-1 demonstration.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

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INTERNATIONAL® DROTT®

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180 North Michigan Ave., Chicago 1, Illinois

Gentlemen:
Please send 4-In-1 catalog literature checked:

☐ 1-yd. TD-6 (CR-640-H) ☐ 1½-yd. TD-9 (CR-627-H) ☐ 2¼-yd. TD-14 (CR-635-H) ☐ 3-yd. TD-18 (CR-632-H)

Name______________________________

Street or R.F.D.______________________________

City____________________ State__________

Hauling through hub-deep mud or spreading sub-base to specs...

Paywagon® fleet delivers 90% working every shift on Illinois

A fleet of six International 75 Paywagons is making performance history—spearheading 5.4 miles of Illinois Toll Road construction, and relocating four miles of creek channel for CKG Associates,* on ex-marshland skirting Western Springs, Illinois.

Taking the mauling abuse of highballing 15-yard loads over rutted haul roads, chuck-holes, and grades, the Paywagon fleet is setting an amazing 90% "availability" record—through month after rugged month of 10-hour-shift days!

"Paywagon availability has been over 90% on this job," reports William P. Cagney, Jr., president, Contracting Material Co,

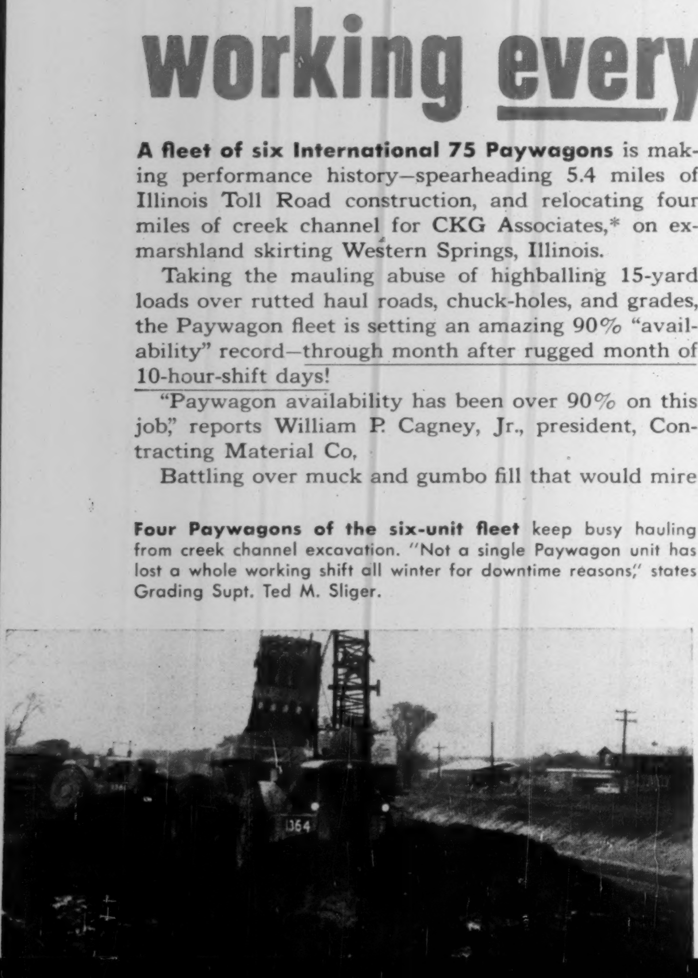
Battling over muck and gumbo fill that would mire low-slung rigs to a belly-dragging stall, the Paywagons give competitive bottom-dumps on the job a real lesson in traction, maneuverability, and clearance!

In addition, CKG Associates are using the cost-cutting controlled dumping Paywagon feature—another big International exclusive—to lay sub-base wholesale with dump-truck accuracy!

Try 75 Paywagon soft-fill beating traction and clearance—compare its load-speeding turbo-charged diesel hp! Measure advantages like planetary final drives. See how Hydro-Steer, selective and dual-wheel braking add operating ease and safety. Try controlled dumping accuracy. See your International Construction Equipment distributor for a demonstration.

*CKG Associates is composed of Contracting Material Co., Kenny Construction Co., and Louis Garavaglia. I. C. "Red" Harbour is Project Manager on the CKG job.

Four Paywagons of the six-unit fleet keep busy hauling from creek channel excavation. "Not a single Paywagon unit has lost a whole working shift all winter for downtime reasons," states Grading Supt. Ted M. Sliger.



International® Construction Equipment

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

Here comes a 75 Paywagon with a 15 cu yd load hauling in typical gumbo conditions. "These 2-axle units will pull through the soft fills much better than any others we've used," states William P. Cagney, Jr., President, Contracting Material Co.

availability toll road!

Paywagon speed and "off-road" mobility enable the contractor to keep ahead of schedule on sub-base spreading with only two "75" units! The toll road will accommodate six 12′ traffic lanes. The contract involves building 16 traffic interchange structures!

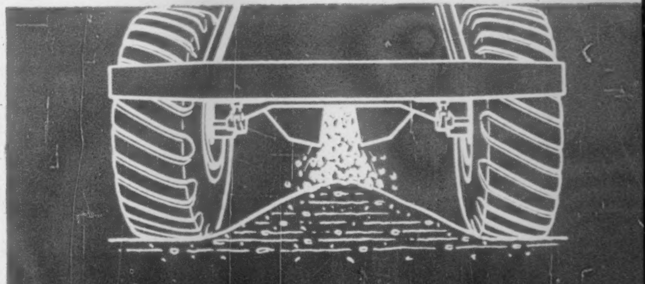
How Paywagon controlled dumping lays sub-base to engineer's specs!

Paywagon design provides simple, one-cable door control. An ingenious cable sheave arrangement, plus geared-together clam-action door design gives a simple, trouble-free Paywagon dumping mechanism.

This positive door-opening control permits the operator to windrow material accurately, or spot his full load exactly where desired.

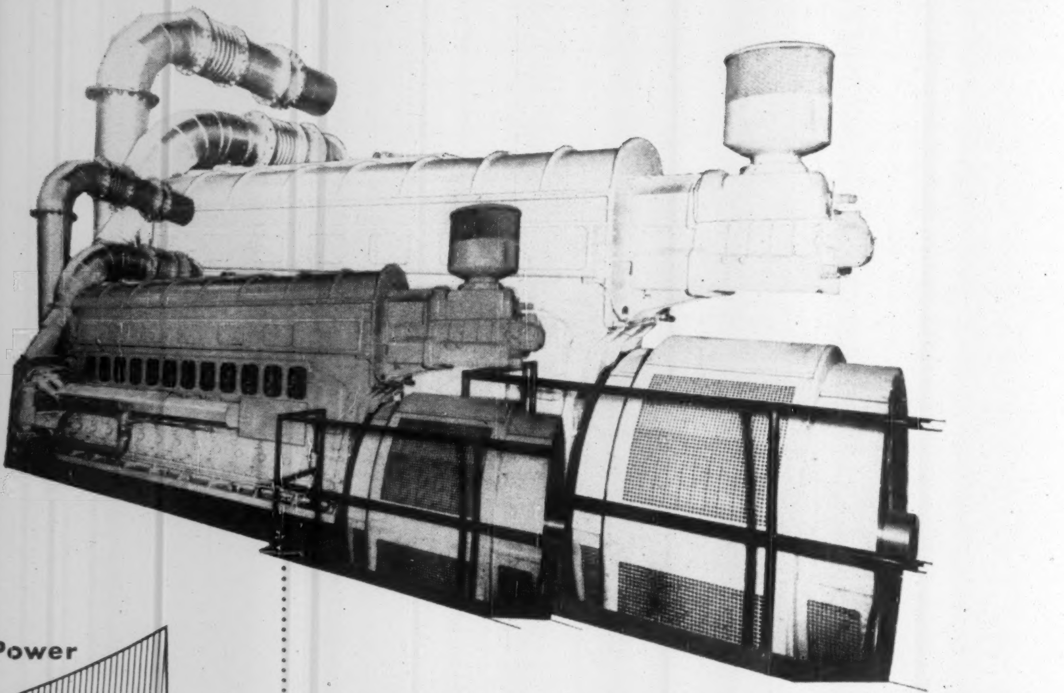
High Paywagon clearance of 41 inches gives ample room to straddle dumped loads. The clam doors open out and up—leaving no dangling projections to foul up in windrows or fills.

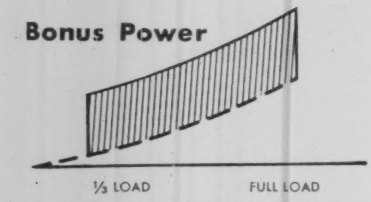
Only the International Paywagon gives you this positive controlled dumping.



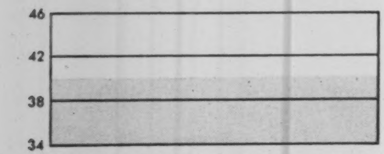
Dragline-loaded Paywagons haul select sub-base material—precision spread it with controlled dumping for blading and compacting in 5-inch lifts. Sketch shows how cable controlled clam doors permit placing 15 cu yd loads with dump-truck accuracy. Motor grader spreads the material.

50% More Power with Fairbanks-Morse TURBOCHARGED OPPOSED-PISTON DIESEL





Auxiliary blower is automatically declutched at loads above approximately 1/3 rating to deliver more usable power at the flywheel.



Turbo-charged Fairbanks-Morse Model 38TD-8 1/8 Opposed Piston Diesel is approaching a new high of 40% efficiency.

New Efficiency...New Power...New Fuel Savings For Marine and Stationary Applications

The industry's most compact, simple, and dependable diesel—the Fairbanks-Morse Opposed Piston—*is now turbo-supercharged!* Fuel savings from 5% to 10% are effected on full-load operations—even more on part loads. And 50% more power has been added. At 900 rpm, for example, it is conservatively rated at 300 hp per cylinder. Yet it occupies vitually the same space as the non-supercharged version...weighs only about 8% more. Look at the advantages in this usually low size and weight per horsepower.

Stationary installations—save on foundation and building costs.
Commercial marine use—more power, speed, fuel and cargo capacity.
Portable operations—save with most compact power available today.

Greater power is available at higher altitudes because the engine is less sensitive to atmospheric pressure. Oil and water cooling requirements show almost no increase at the higher output. It's all possible with careful matching of system and engine. Divided manifolds permit use of exhaust pulses with no pressure cancellations. Engine-driven auxiliary blower provides scavenging air up to ⅓ load—declutches above this figure to make additional power available at flywheel. For full information write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

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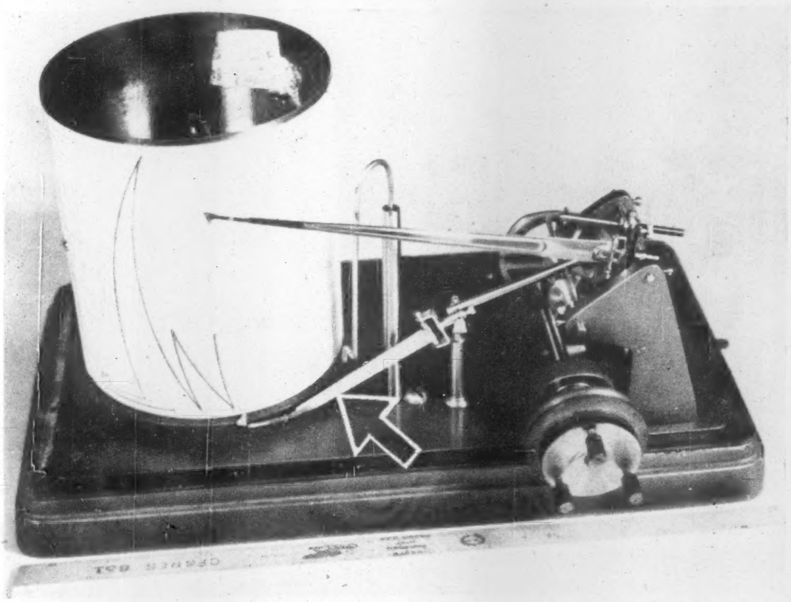
a name worth remembering when you want the BEST

DIESEL AND DUAL FUEL ENGINES
DIESEL LOCOMOTIVES • RAIL CARS
ELECTRICAL MACHINERY • PUMPS
SCALES • HOME WATER SERVICE
EQUIPMENT • MAGNETOS



STREAMFLOW RECORDER with a reversal indicator mechanism attached.

Added Pen Takes Guess Out of Flow Gage

A pen attachment that can be mounted on reversal-type measuring instruments to help interpret streamflow charts has been developed by Lowell A. Andrews, of the U. S. Department of Agriculture's Forest Service. Records of water level obtained with some reversal-type instruments are difficult to interpret when a rising or falling water stage changes direction at the same moment the recorder pen reaches the point of its reversal at the top or bottom of the recorder chart. To aid in the correct interpretation of streamflow charts, a reversal indicator attachment for Friez (FW-1) water level recorders has been developed at the San Dimas Experimental Forest—a field unit of the California Forest and Range Experiment Station.

The attachment is a special pen that marks along the bottom margin of the chart and changes position each time the recorder pen reaches the top or bottom of the chart. When the recorder pen reaches either margin of the chart, but does not complete a reversal, the indicator pen returns to its original position. If a reversal is completed, the pen remains in the changed position until the next reversal occurs. Without this reversal indicator and in the absence of field observations at these critical points, it is impossible to determine whether the water stage continued moving in a given direction or reversed direction when the recorder pen reached the top or bottom of the chart.

Plastic Pipe Relieves Hydrostatic Uplift

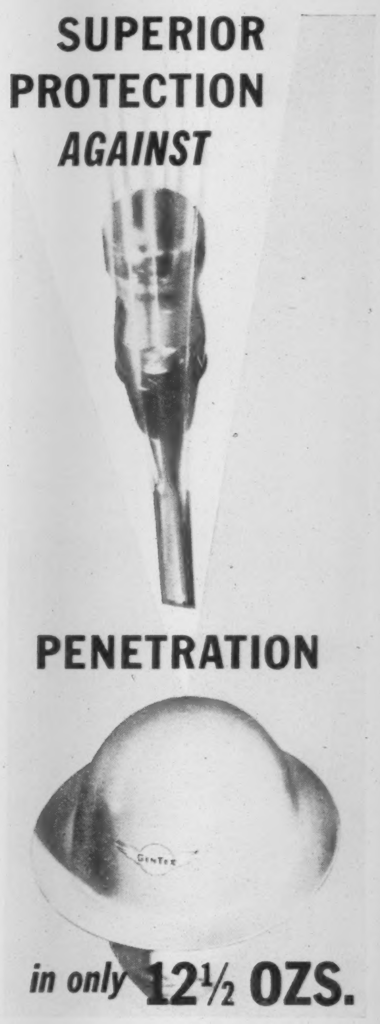
Plastic pipe forms the drop pipe for wells used to relieve hydrostatic pressures below dikes that contain the pool behind Long Sault and Barnhart Island Dams of the St. Lawrence Power Project. The 6 in. dia pipe is perforated by a series of 4 in. long, ⅛ in. wide slots to tap water from pervious zones 20 to 50 ft beneath the dikes.

More than 2,000 lin ft of the plastic pipe will go into 23 relief wells and drainage channels. It is being used to avoid deterioration and replacement of commonly used metal and wood pipes.

Water will stand in the pipe at a height determined by water level in the power pool. At high pressures the water will rise to a point just below ground level, where it will discharge into a lateral drainage line that leads away from the dike area. The lateral, 5 ft below ground, discharges through gravel to prevent freezing.

Lauman Construction Co., Bethpage, N. Y., is the contractor. The pipe is B. F. Goodrich's Koroseal polyvinyl chloride type.

(*Field & Office continued on page 126*)



GENTEX SAFETY HAT
gives you LIGHTWEIGHT COMFORT WITH NO SACRIFICE OF PROTECTION.

It far exceeds all Federal safety specifications — including penetration resistance offered by no other lightweight hat — yet weighs within ¾ ounce of any hat made!

All-shift, every-shift protection with:

- Permanent no-wrinkle headband
- Insulation against heat, sun (and over 15,000 volts resistance)
- Snap-in sling and headband with fingertip adjustment
- Handsomely styled for steady wear in green, gray, white, yellow, blue.

MEN LIKE ITS COMFORT...*THEY WEAR IT!*

Send today for a test hat and full specifications. Ask about our lightweight, washable winter-liners

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World's foremost manufacturer of helmets for the military

GENERAL TEXTILE MILLS, INC. DEPT. N
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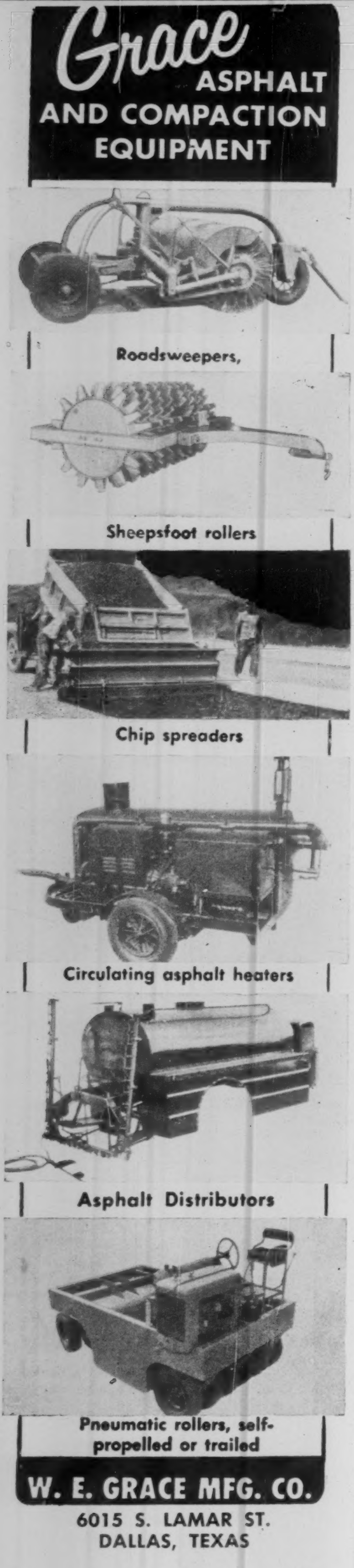

Grace ASPHALT AND COMPACTION EQUIPMENT

Roadsweepers,

Sheepsfoot rollers

Chip spreaders

Circulating asphalt heaters

Asphalt Distributors

Pneumatic rollers, self-propelled or trailed

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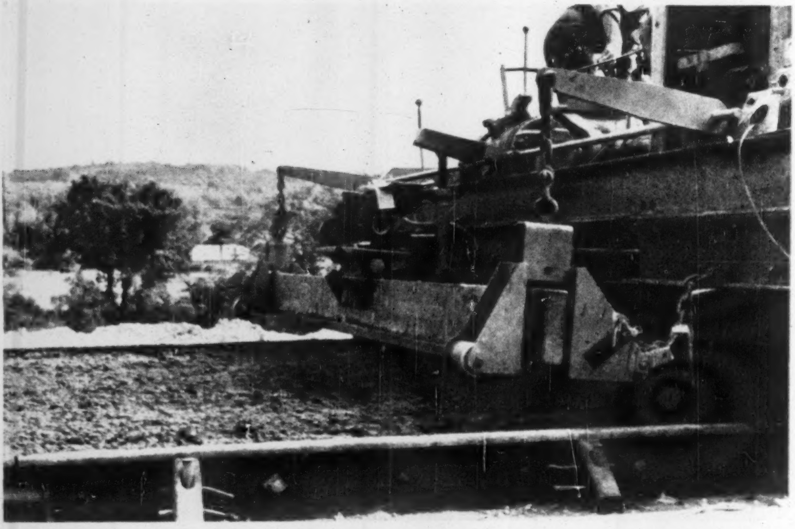
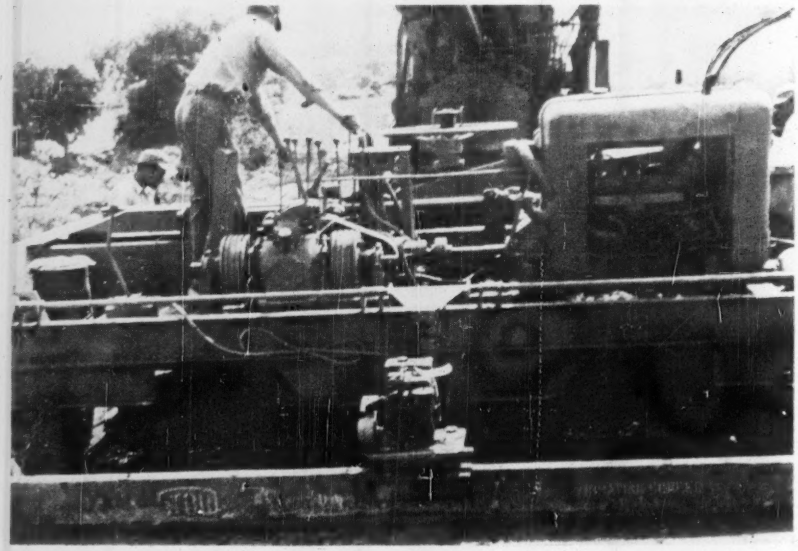


VIBRATING SCREED attached to road spreader is lifted from slab by hydraulic lift. Chain attachment pulls screed when lowered.



ROAD SPREADER tows vibrating screed to strike off and vibrate concrete after it has been spread by equipment ahead.

Spreader Plus Screed Meet Specs

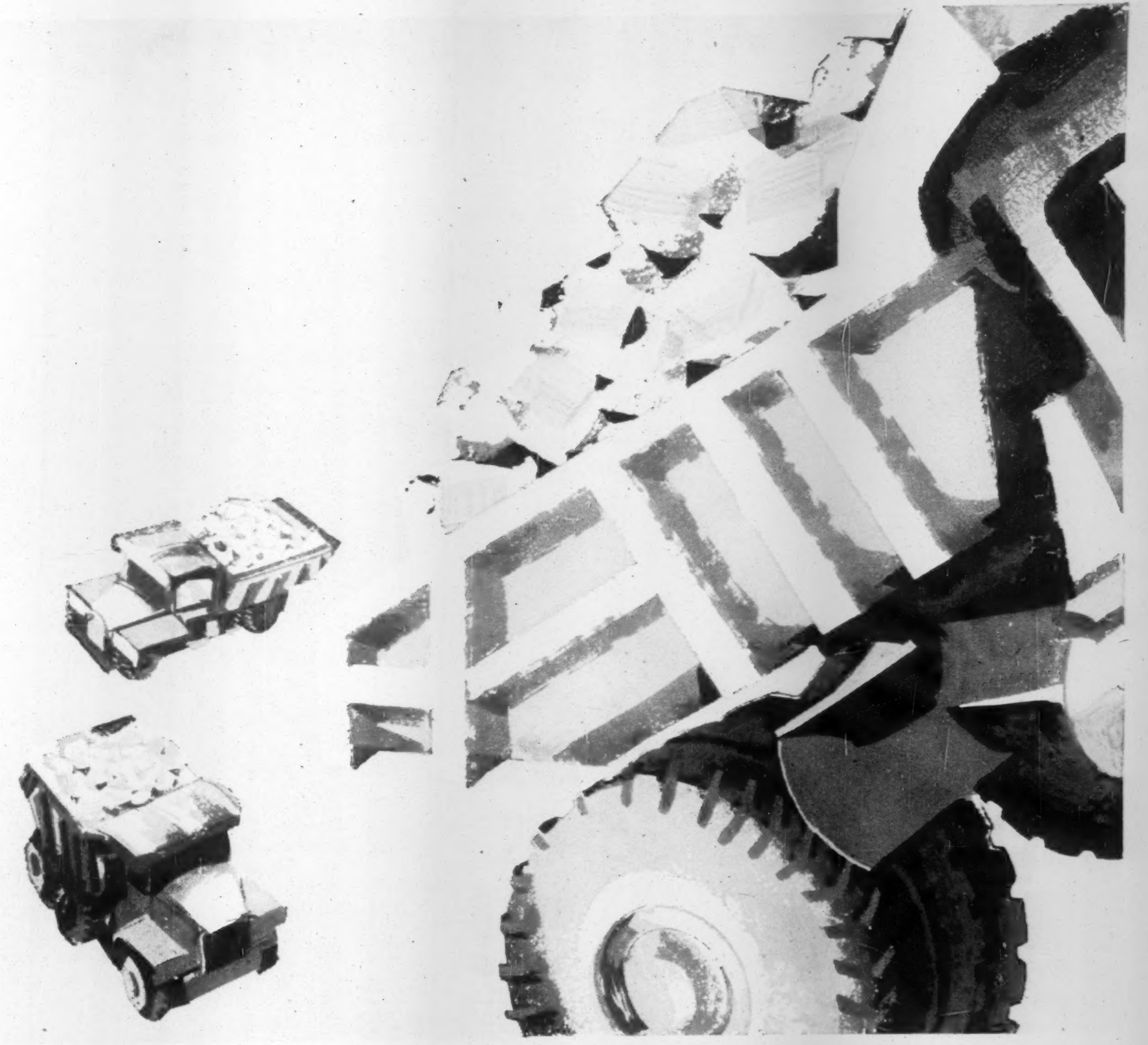
When T. J. Camarco of Camarco Contractors, Inc., Carmel, N. Y., needed a vibrator for his concrete road spreader to meet New York specifications, he attached a hand vibrating screed to the back of his spreader to strike off the concrete.

Stow Mfg. Co. of Binghamton, N. Y., made up one of their 12 ft long J S vibrating screeds, attaching flanged rollers to ride the forms. Eyebolts also were mounted on top of the end roller assemblies.

Then the contractor rigged a hydraulic lift to the eyebolts so that when the screed was lowered into place it was pulled along with chains attached to the spreader.

The contractor claims that the rig was low in cost and yet met the state's road-finishing requirements.

(*Field & Office continued on page 128*)



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For over-all economy, you just can't beat Cyanamid's complete line of highest quality explosives. You achieve maximum efficiency from every Cyanamid blast . . . your rock is fragmented for easy loading and hauling!

Cyanamid's trained technical staff has years of practical field experience to put at your service in working out special blasting problems. They will be glad to show you how Cyanamid's quality blasting materials can help you get more for your blasting dollar. For expert assistance and quick delivery to your site, call your Cyanamid representative, or write to

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CLIK-STOP
ADJUSTABLE WRENCHES
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GOLDEN KNURL HOLDS EXACT JAW OPENINGS AUTOMATICALLY!

NO BUTTONS . . . NO LEVERS . . . NO GADGETS

Meets Federal Specifications: GGG-W-631A, Type 1

Save your hands with Proto's Clik-Stops...adjustable wrenches with jaws that won't work loose or change adjustment...even when dropped or knocked against work. The Clik-Stop saves hands...and readjusting time ...lets you put in more labor.

Available in FIVE popular sizes*

704L	706L	708L	710L	712L
4",	6",	8",	10"	12"

*Soon Available:

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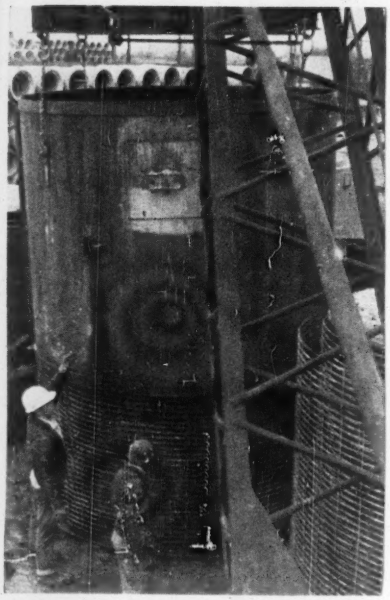


CONCENTRIC CAGES of .505 in. dia welded wire fabric reinforces 8 ft dia concrete pipe sections for interceptor sewer.

Heaviest Wire Reinforcing Is Used in Concrete Pipe

A $10.3 million concrete sewage interceptor line now under construction in Louisville is reinforced with what is believed to be the heaviest gauge welded wire fabric ever used. The 8 ft dia pipe with 9 in. walls is over 2 miles long.

The reinforcement consists of 0.505 in. dia wires at 2 in. centers circling the pipe with 4 ga wires at 8 in. centers spacing the heavy wires. The heaviest wire used until now is believed to be 0.490 in. dia.

Two concentric cages of the fabric are used in each 8 ft long section of the concrete pipe, the heavy reinforcement being required to withstand the load from up to 47 ft of backfill.

In addition to the fabric reinforcement, ½ in. round stirrups are used at top and bottom for shear resistance. These are spaced 4⅓ in. circumferentially, and 6 in. lengthwise, with a total of 12 around each band.

Kentucky Concrete Pipe Co. is manufacturing an average of three 8 ft sections a day in its Louisville plant. Stirrups are welded to maintain 6 in. spacing between the inner and outer cages. The pipe, made up of 5,500 psi concrete, is steam cured at 130 F for a period of 24 hours. Three-edge bearing test results should hairline cracks at 70,000 lb load and .01 in. cracks at 195,000 lb.

Contractor is Rocco Ferrera of Detroit. Consulting engineer on the sewerage project is Metcalf & Eddy, Boston.

Tru-Stop Brakes

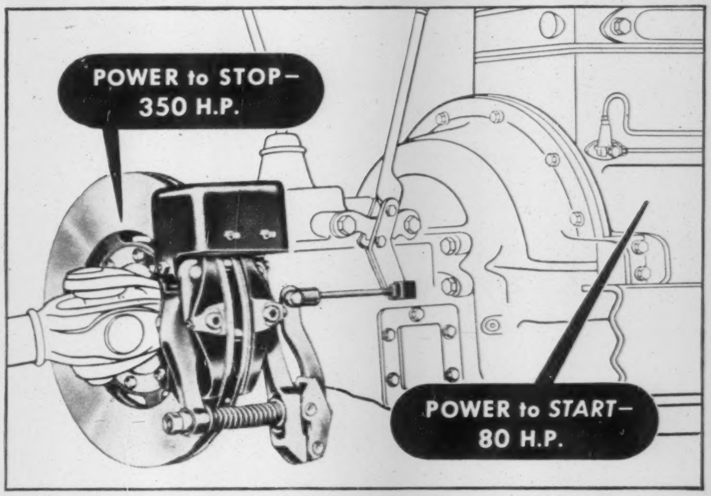
Meet Every Heavy-Duty Safety Requirement

OFFER POSITIVE PROTECTION AGAINST RUNAWAY OR PARKING ACCIDENTS—AT LOWEST COST

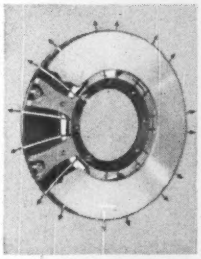
HERE IS WHY:

They have surplus power required for emergency service—no dangerous self-energizing

TRU-STOP Heavy-Duty Emergency Brakes are not only excellent parking brakes. They serve as a complete, independent and fully reliable braking system. Operating on the propeller shaft they enable the driver to continue on safely in the event of service brake failure. TRU-STOP brakes have the surplus braking capacity to be used *repeatedly* as an auxiliary to service brakes.

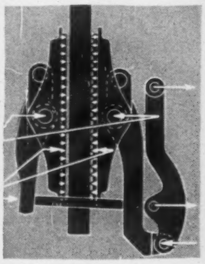


Brakes actually do more work than the engine in terms of horsepower Where it takes 80 HP to accelerate to 20 miles per hour, it takes 350 HP to make a safe stop from 20 miles per hour within required limits



Ventilated to throw off heat

Brake efficiency depends on ability to throw off intense heat—rapidly. Discs of TRU-STOP brakes are exposed to the air even during the braking operation. Ventilated design circulates air *between* the disc plates.



Give uniform brake pressure

Disc of TRU-STOP brakes is "squeezed" between the flat surface of the shoes. Effort applied to brake lever operates front and rear lever arms simultaneously. Pressure is exerted on the center of each shoe. Entire lining surface is in contact.

FOR SAFE, ECONOMICAL, HEAVY-DUTY BRAKING WITH MAXIMUM LIFE AND MINIMUM MAINTENANCE

TRU-STOP Brakes are used on a great variety of mobile and stationary equipment

SUCH AS—

- Motor cranes
- Road rollers
- Dump trucks
- Power dividers
- Cooling tower fans
- Oil well pumps
- Cold header presses
- Scrubbing machines
- Wire rope stranders
- Fork lift trucks
- Motor scrapers
- Tractors
- Graders
- Diamond core drills
- Electric locomotives
- Oil well servicing rigs
- Railway inspection cars
- Shapers
- Power take-offs
- Winches
- Motor shovels
- Tractor loaders
- Conveyors
- Hard rock drill positioners
- Mine locomotives
- Power presses
- Railway power ballisters
- Cable tool spudders
- Aerial tram cars
- Tension wire stringers

We will be glad to answer any questions or give you more detailed information about TRU-STOP Heavy Duty Emergency Brakes. Send for
Catalogs DH-33 and DH-530

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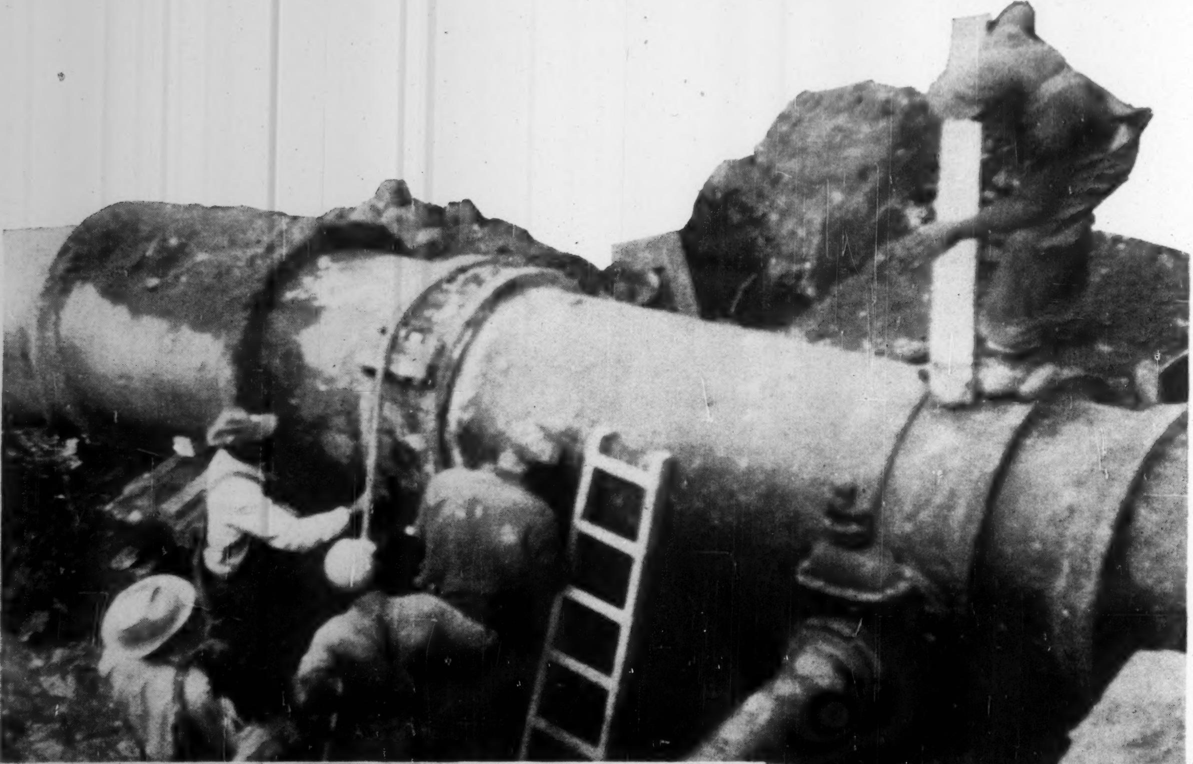
ANY PIPE CAN PROMISE...

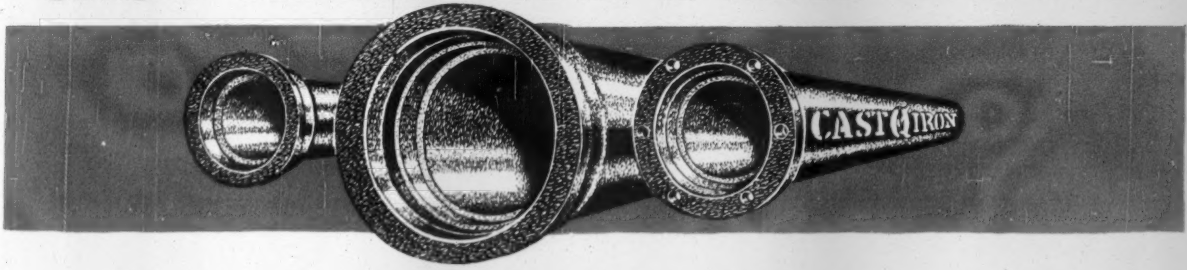


50 YEARS YOUNG! This 36" Cast Iron Pipe feeder main was installed in 1907. Taken up in 1954 because of relocation project, it was relaid in 1956 for a bypass line around new highway interchange.

Close-up of section of above pipe 1,958 feet of which was cleaned and reused.

MODERNIZED **cast iron**

CAST IRON PIPE PERFORMS!



What other pipe offers you LONG LIFE + STRENGTH + HIGH FLOW CAPACITY?

Don't doubt when you buy pipe—specify cast iron and be sure of...

1. LONG LIFE...
   42 North American cities are still using cast iron water mains laid 100 years and more ago. Hundreds more have passed the 50 year mark.
2. BEAM STRENGTH...
   Cast Iron Pipe is inherently tough... stands up under heavy traffic load, soil displacement and disturbance.
3. HIGH FLOW CAPACITY...
   Cement lined cast iron pipe and fittings will not tuberculate... delivers a full flow for the life of the pipe.
4. EXTERNAL LOAD RESISTANCE...
   6" Class 150 Pipe withstands a crushing load of 17,900 pounds per foot... nearly 9 tons.
5. CORROSION RESISTANCE...
   Cast Iron Pipe effectively resists corrosion... vital factor in its long life and dependability.
6. TIGHT JOINTS...
   A full range of leak-proof, low cost, easy-to-assemble joints for pipe and fittings are available for all conditions.

You've read and heard thousands of words—all selling pipe.

But make no final choice before you ask this simple question: What pipe offers you not one, not two but *all* the factors that spell long, trouble-free life and dependability.

The answer is... cast iron pipe. Performance made it... and performance keeps it... America's No. 1 Water Carrier.

Its service record *proves* it!

THE MAN WHO CHOOSES CAST IRON PIPE TODAY WON'T PAY FOR IT AGAIN TOMORROW!

CAST IRON ®

Cast Iron Pipe Research Association
Thos. F. Wolfe, Managing Director
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pipe FOR MODERN WATER WORKS

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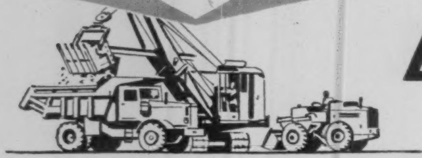


DIGS OUT BREAKDOWN CAUSES!

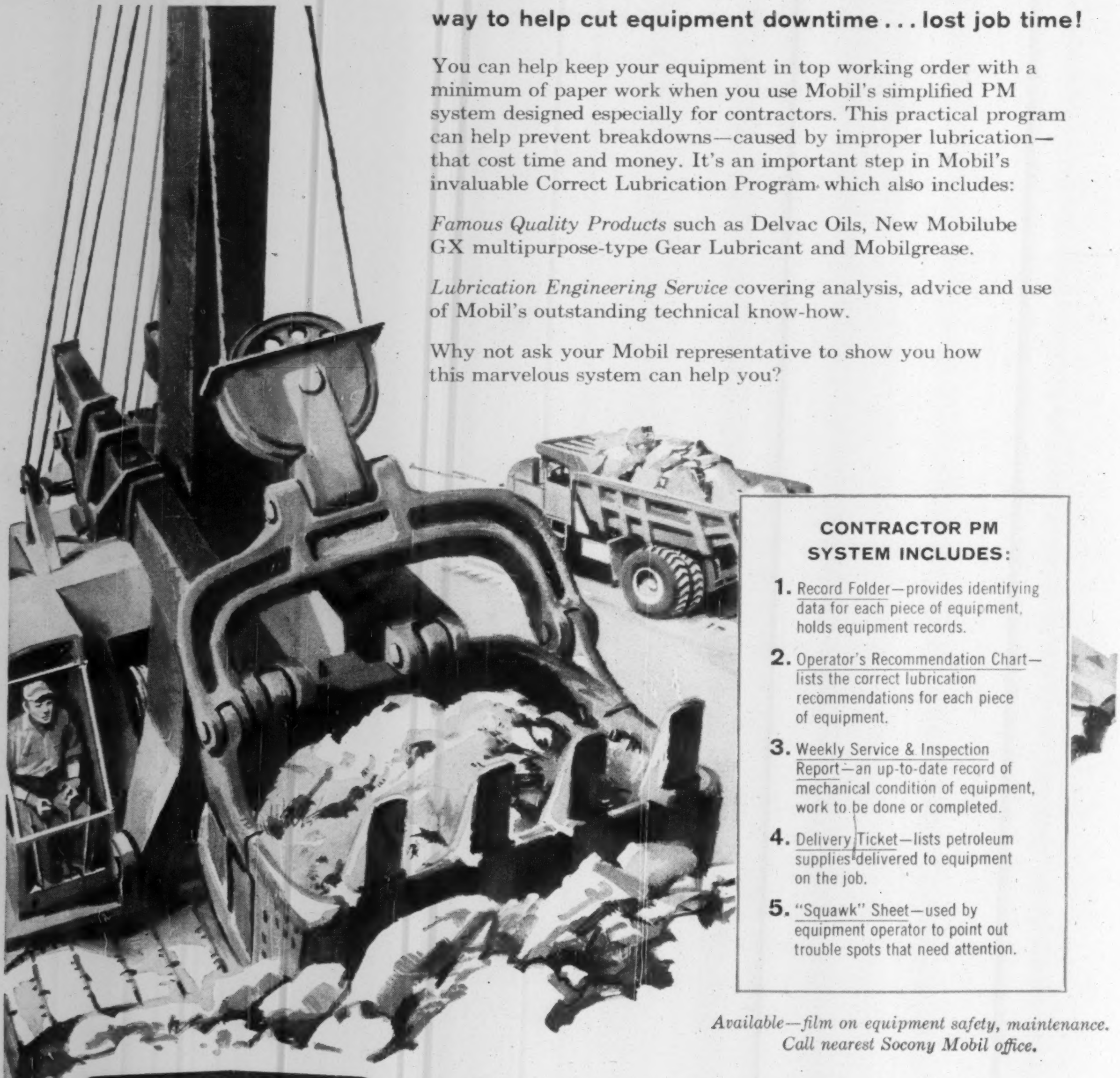
Use Mobil's Contractor PM System—the easy way to help cut equipment downtime . . . lost job time!

You can help keep your equipment in top working order with a minimum of paper work when you use Mobil's simplified PM system designed especially for contractors. This practical program can help prevent breakdowns—caused by improper lubrication—that cost time and money. It's an important step in Mobil's invaluable Correct Lubrication Program which also includes:

Famous Quality Products such as Delvac Oils, New Mobilube GX multipurpose-type Gear Lubricant and Mobilgrease.

Lubrication Engineering Service covering analysis, advice and use of Mobil's outstanding technical know-how.

Why not ask your Mobil representative to show you how this marvelous system can help you?



CONTRACTOR PM SYSTEM INCLUDES:

1. Record Folder—provides identifying data for each piece of equipment, holds equipment records.
2. Operator's Recommendation Chart—lists the correct lubrication recommendations for each piece of equipment.
3. Weekly Service & Inspection Report—an up-to-date record of mechanical condition of equipment, work to be done or completed.
4. Delivery Ticket—lists petroleum supplies delivered to equipment on the job.
5. "Squawk" Sheet—used by equipment operator to point out trouble spots that need attention.

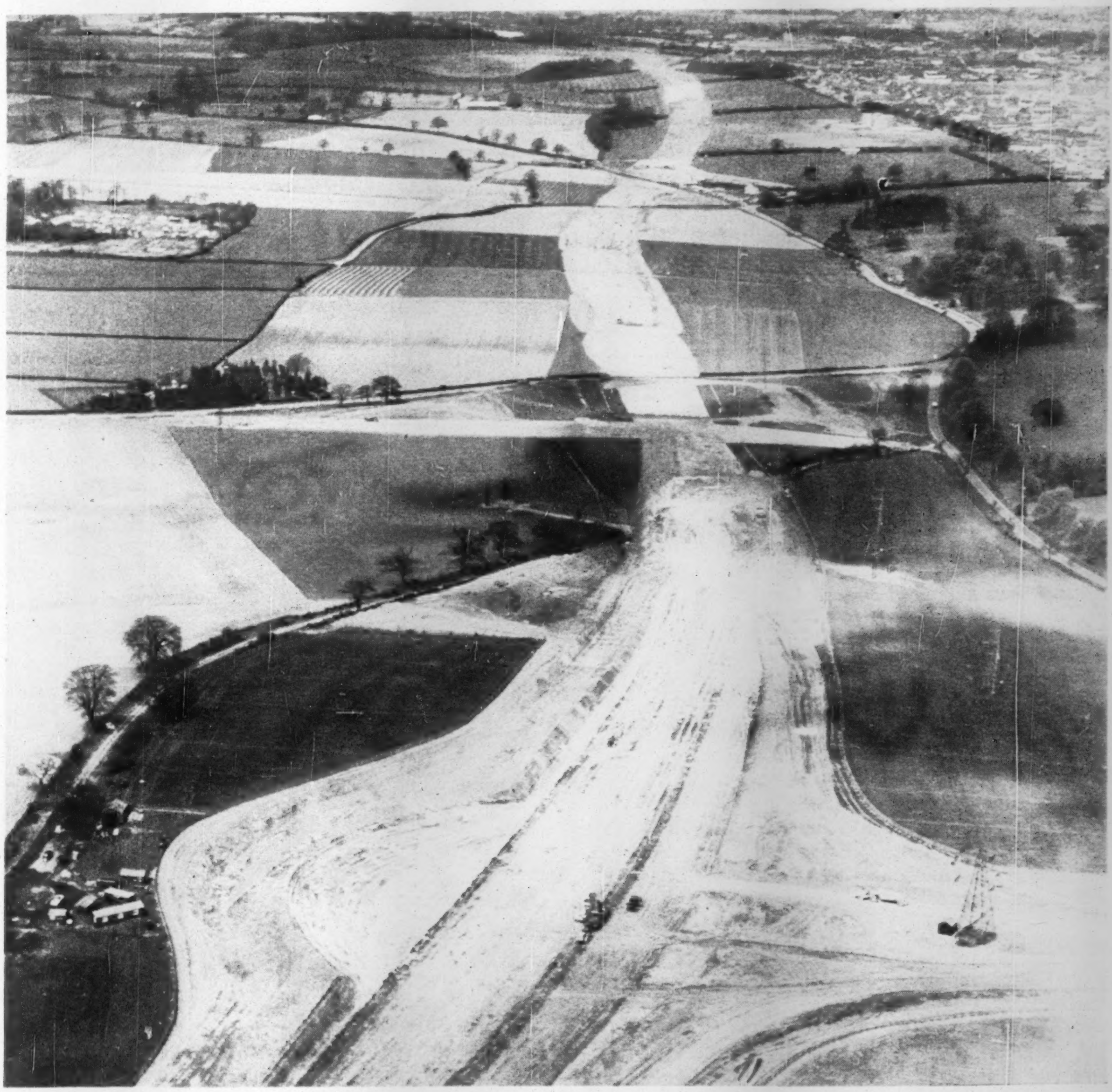
Available—film on equipment safety, maintenance. Call nearest Socony Mobil office.

Mobil

Correct Lubrication

Another reason you're Miles Ahead with Mobil!

SOCONY MOBIL OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION



71 MILES LONG this English road will cut through farmland, skirt villages and towns.

Tight Schedule for Largest British Road

Contractors will have only 19 months to complete the 71-mile divided highway between London and Birmingham. That's an average of one mile of roadway every eight days and one bridge every four days.

"If we were constructing it across virgin prairie, this might not be so remarkable," says Minister of Transport, Harold Watkinson. "But we are driving it through the heart of this small, densely populated and highly developed island."

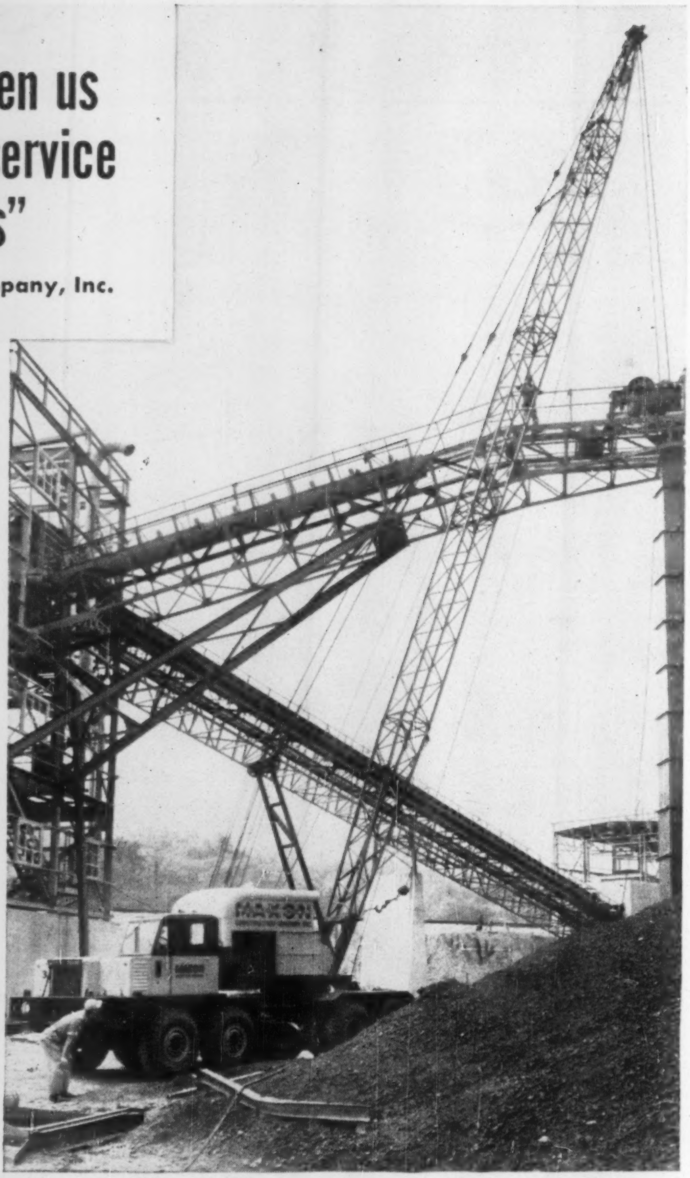
It's the first new national highway to be built in England in this century, as well as the largest one ever.

A $42 million contract, won by John Laing & Sons, for a 53 mile section is the largest single contract ever awarded by the Ministry of Transport. A $14 million contract covering the first 12 mile section south of that point was awarded to Tarmack Civil Engineering Ltd. The remainder of the contracts have not been announced yet.

For most of its length, the freeway will consist of 36 ft divided roadways, separated by a median strip. A few short stretches will have only 24 ft roadways. There are 200 overpasses to

"Our LORAINS have given us excellent, dependable service down through the years"

Maxon Construction Company, Inc.



43 LORAINS

purchased by Maxon Construction Company, Inc. of Dayton, Ohio, is the reason for the above statement by Maxon's Vice President C. L. Ohl.

Maxon has purchased Lorains for years, of many different sizes and types, on crawlers and rubber tires, as cranes and as excavators. Their latest is a 35-ton Moto-Crane, model MC-530W, shown erecting a coal conveyor at the Dayton Power and Light Company.

This is the crane that has the reputation of setting the pace on any construction job. It has that *extra* workability in those ranges *where the work is done.* It can carry that *extra* length of boom. It will move in quickly and travel with those *extra* heavy loads.

It has too many features to list them all here. Read about just three Lorain exclusives below. Then ask your Thew-Lorain Distributor to show you all the others. And check, too, on his on-the-spot parts and service facilities that are such a plus value when you buy a Lorain.

1 "SHEAR-BALL" TURNTABLE MOUNTING

for greater capacities

Develops greater capacities. Vertical, horizontal and radial loads and thrusts are carried by over 60 hardened steel balls. Like a huge, sealed ball bearing. It revolves freely and smoothly regardless of load. In use for 8 years.

2 LIGHTER, STRONGER SQUARE-TUBULAR-CHORD BOOM

for greater capacities

Main chords are sealed, square-section tubes, joined with continuous round tubular lacing. This exclusive boom design is lighter, stronger — gives greater capacities, permits longer reaches.

3 "8 x 4" ROCKER BEAM CARRIER

for greater capacities

The optional "8 x 4" carrier has two front axles, doubling the front axle carrying capacity. Rocker beam front axle bogie further increases lifting capacities "on-rubber," without outriggers.

When you see your Thew-Lorain Distributor, ask him about the many other features that have been the reason why Maxon Construction Co. has specified and purchased Lorain equipment 43 times.

THE THEW SHOVEL CO., LORAIN, OHIO, U. S. A.

RELIABILITY IN ACTION THEW LORAIN®

SOGGY SOIL adds to road headaches. Tracks were needed when tires bogged down.

HURRY-UP JOB calls for fast-moving earth hauls with bottom dump trucks.

be built with nine intermediate two-level ramps that will connect with other major roads. There will be 150 bridges.

Statistics for the limited access highway are impressive by British standards. Over 14 million cu yd of earth will be moved and 4 million sq yd of roadway will be paved. It will take over 300,000 cu yd of concrete alone for the bridges and 12,000 tons of steel reinforcement. At the job's peak, nearly 4,000 men using over 1,000 major pieces of road-building equipment will be employed. To speed the work, plans call for a helicopter and light aircraft to be used for supervising and carrying small parts. High frequency radio communication and teleprinter circuit also will be used during construction.

Roadside service areas with restaurants, telephones, rest rooms, filling stations and parking areas will be located at 12 mile intervals.

The major portion of the freeway is to be hot-rolled asphalt. The Ministry of Transport made the decision to use asphalt after bids had been called for both asphalt and concrete construction. The deciding factor in the choice is said to have been the belief that asphalt held up well under high speed traffic and had a lower initial cost.

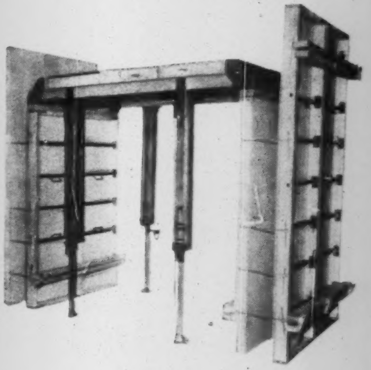
The roadway will have 2 ft thickness. The base course will be six inches of compacted, crushed stone. Above this will lie a 14-in. course of either lean concrete or water bound macadam. This will be topped by a 2½ in. macadam base course and finally by a 1½ in. asphalt wearing course.

For long hauls, earthmoving equipment will be rubber-tired scrapers capable of carrying 20 to 30 tons. Elevator loader-excavators fitted with giant blades will feed conveyor belts that will move the earth to dump trucks. On the short hauls, track excavators will be used.

Sir Owen Williams and Partners were consulting engineers for the freeway.

(*International continued on page 136*)

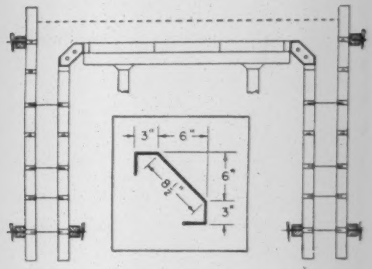
Culvert Forming



Symons Develops New Haunch Form for Culverts

Symons Safety Shores Used to Support Slab

Symons now has a new 9 x 9 inch steel haunch section designed to connect Symons standard wall panels and slab panels for the monolithic pouring of culverts. This new section provides for a 3-inch face on the roof slab and



on the wall with a 45-degree-angle surface 8½ inches wide between wall and roof. No built-up forms or other special equipment is necessary.

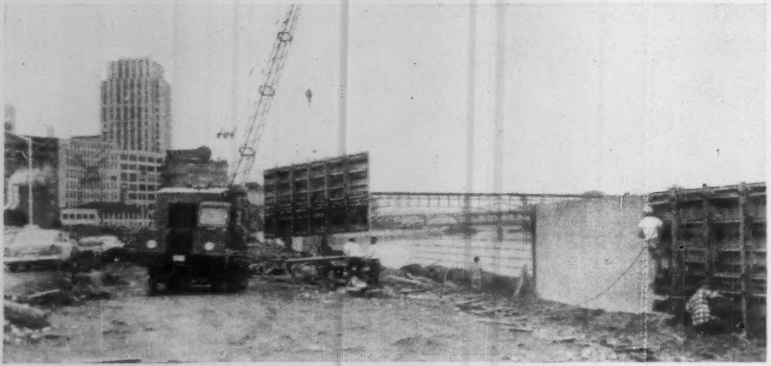
Made of 11-gauge hot rolled steel this new section is available in 4, 6, and 8 foot lengths. It can be used with either metal frame or wood frame forms. Symons regular form hardware is used for securing the steel section to Symons standard forms. No special fittings are required.

Symons forms, shores and column clamps may be rented with purchase option. FREE literature on Symons products is available upon request.

Symons

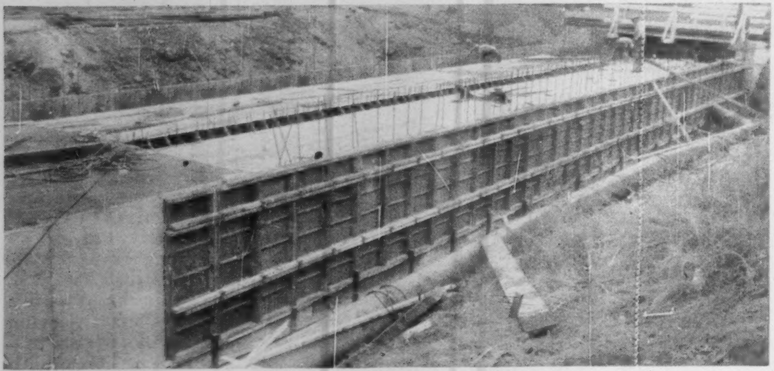
SYMONS CLAMP & MFG. CO.
4265 Diversey Avenue, Dept. F-8
Chicago 39, Illinois

ROAD BUILDING with Symons Forms



Gang Forming . . . Symons wide panel forms made up in sections of 10′ x 24′ and 15′ x 24′ used to pour 2,400 foot long retaining wall.

Bridge Forming . . . By using Symons high strength forms, contractor was able to reduce pouring time, use fewer men and cut 100 days off bridge forming job.

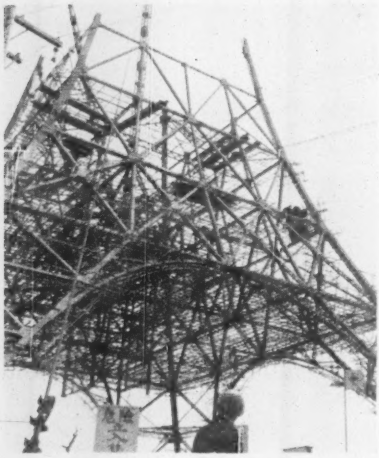


Culvert Forming . . . A new 9 x 9 inch steel haunch section designed to connect Symons standard wall panels and slab panels for the monolithic pouring of culverts.

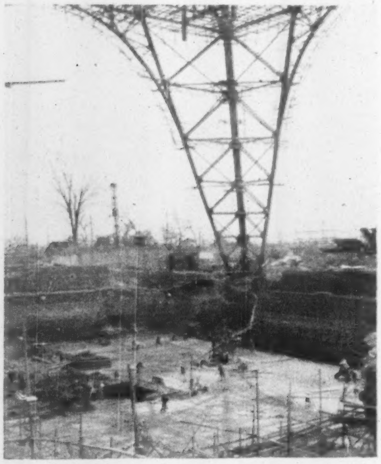
Symons can help you with your forming problems. Our engineers will prepare complete form layouts and bill of materials at no obligation. Other Symons products used in road building are bar ties, tie chairs, column clamps and shores. Forms, shores and column clamps may be rented with purchase option—rentals to apply on purchase price. Information on Symons products and services sent FREE on request.

Symons CLAMP AND MFG. CO.

4265 Diversey Avenue **Dept. F-8** **Chicago 39, Illinois**



Tower Straddles . . .



. . . Exhibit Hall Site

A 1,096 ft TV tower and a five-story electronics exhibit building are going up on the same site in central Tokyo's Shiba Park. The building will nestle beneath the spreading four-legged base of the transmission structure.

Arched from leg to leg at the base, the steel tower is a little suggestive of the 69 year old Eiffel Tower in Paris. And like the 984 ft French structure, it will cater to sightseers. Observation platforms will be installed 380 and 759 ft above ground for the use of an expected 12 million visitors a year.

The building, with two basements, will contain 30,000 sq ft of floor space. Control rooms for Tokyo's six TV stations will occupy the fifth floor.

The $6 million job is financed by 26 Tokyo businessmen. Takenaka Construction Engineering Co. is the builder.

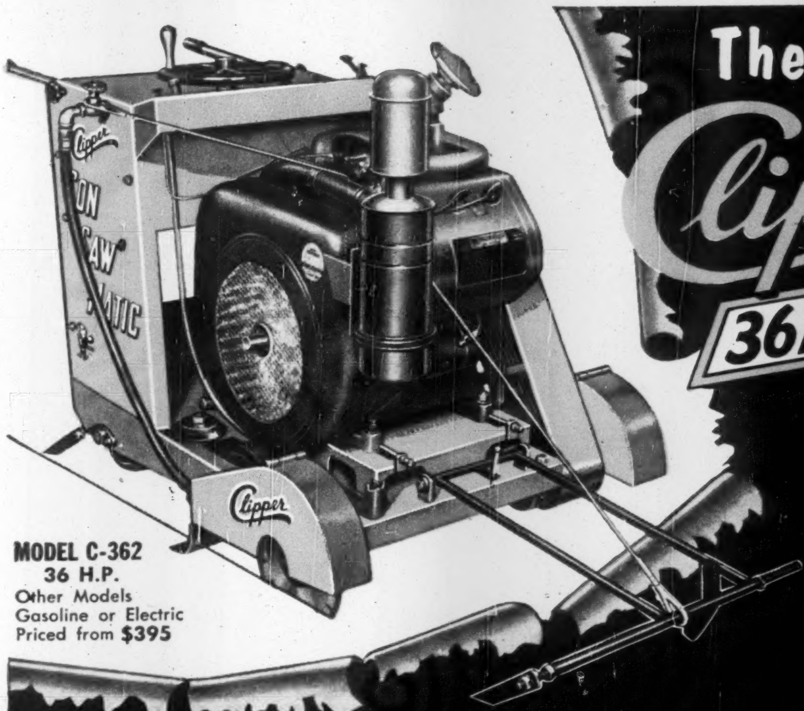
(*International continued on page 138*)

The All NEW

Clipper

"SAILS RIGHT THRU"®

36 H.P. SELF-PROPELLED CONCRETE SAW



MODEL C-362
36 H.P.
Other Models
Gasoline or Electric
Priced from **$395**

features

- DUAL BALANCE DESIGN
- POWERFUL HEAVY-DUTY TRANSMISSION
- POSITIVE BALL BEARING SCREW FEED
- 6 STEEL-CABLE-REINFORCED V-BELTS

USE THIS HIGH PRODUCTION CONCRETE SAW FOR FASTER CUTTING WITH LONGER BLADE LIFE

OVER 36 OUTSTANDING FEATURES FOUND ON NO OTHER SAW!

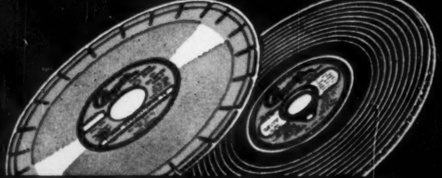
DUAL BALANCE DESIGN—Precision weight distribution for ① Easy Maneuverability . . . one man lifts-up, lines-up, then saws, ② Constant adequate weight over the blade during cutting. Only Clipper has it!

POWERFUL HEAVY DUTY TRANSMISSION—Exclusive Abrasive Coated Drive Wheels transmit power to rear wheels for continuous forward thrust.

POSITIVE BALL BEARING SCREW FEED—Assures accurate cutting depth control. A MUST for abrasive blades.

6 STEEL-CABLE-REINFORCED V-BELTS—Delivers full 100% power to the blade for best economy and performance.

RUGGEDLY BUILT TO GIVE YEARS OF TROUBLE FREE SAWING!



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When you least expect it, fire or other catastrophe suddenly may threaten the financial security of your business overseas.

Your strongest safeguard is a sound, modern insurance program skillfully planned by the experts of the American Foreign Insurance Association. Then you have insurance protection that is snugly fitted to the specific needs of your business and carefully conforms to the requirements of foreign laws and regulations. You also have the assurance of professional service in all parts of the world through men like Mr. Robert D. Barnes, in Australia since 1946.

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LOS ANGELES OFFICE . . . . 3277 Wilshire Boulevard, Los Angeles 5, California
SAN FRANCISCO OFFICE . . Russ Building, 235 Montgomery Street, San Francisco 4, California
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An association of 22 American capital stock fire, marine, casualty and surety insurance companies providing insurance protection in foreign lands

Thomas P. Browne

AIDIS in 10th Year

Sanitary engineers elect Thomas Browne president

The tenth anniversary meeting of AIDIS, the VI Interamerican Congress of Sanitary Engineering, held May 18-24 in San Juan, Puerto Rico, was a rousing success from all standpoints.

Papers presented were more than usually informative. Delegates had every afternoon off for plant visits and other amenities associated with "siesta" time. The congress participated in the opening of Puerto Rico's first sewage treatment plant. And good progress was made toward completing a Spanish-English-Portugese-French sanitary engineering dictionary.

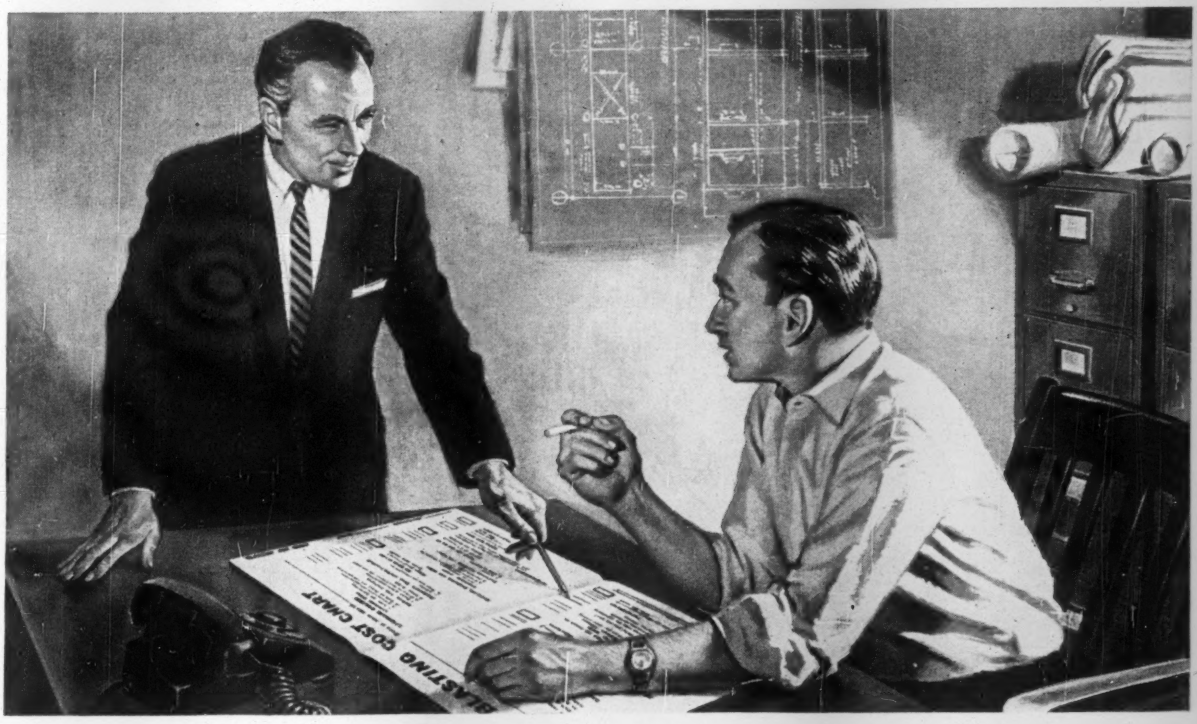
For the first time at a bi-annual AIDIS congress, medals were awarded—by Allied Chemical Co.—for the best papers presented. These went to a group of Door-Oliver Inc. engineers for a comprehensive effort on bio-filtration practice and design; to Rivas Mijares and K. A. Koller of Venezuela, who discussed design and construction of water supply aqueducts in small communities; and to Prospero Ruiz of Columbia for a paper on environmental sanitation.

Delegates were enthusiastic over the "balance" of the meeting: Papers in the morning, siesta in the afternoon, and fiesta in the evening.

Puerto Rico's first sewage treatment plant serves the metropolitan area around San Juan. Designed by Buck, Siefert & Jost, New York City, and built by Raymond International, the plant is a trickling filter facility. It features the use of compressed air to provide constant pressure in the distributors, that assuring constant sewage feed rates onto the trickling filter beds. This

(*International continued on page 140*)

WHAT ARE YOUR *TRUE* BLASTING COSTS?



Get a complete profit picture with new, free Blasting Cost Chart! **Let the Atlas Man show you how**

Explosives costs alone don't always determine value of a blast. The explosives used have a direct effect on drilling, digging, hauling and crushing costs. Now, a free, simplified computing method—developed by Atlas, gives you a true, complete cost analysis of profits, without involved bookkeeping.

The Atlas Blasting Cost Chart enables you to protect or improve your profits. What's more, it's yours without cost and you can keep your figures confidential. The Atlas representative nearest you will be glad to show you how it works—without obligation.

BLASTING COST CHART
TING COST CHART

EXPLOSIVES DIVISION
ATLAS
POWDER COMPANY
WILMINGTON 99, DELAWARE *offices in principal cities*

One Model 3 Geodimeter Saves $100,000. A Year in Highway Program

AGA

REVOLUTIONARY

GEODIMETER

Introducing a new device for direct measurement of distance. This instrument is the result of 15 years of electronic and optical research. This is the instrument that proved the speed of light at the present accepted value 299,793.0 km/sec. The name Geodimeter is developed from GEOdetic Distance-Meter.

OVERALL GEODIMETER SIZE
21 x 14 x 12 inches
Weight:
58 lbs. for Geodimeter
22 lbs. for tripod
10 lbs. for reflector
22 lbs. for generator

ACCURACY:
The model 3 Geodimeter and 2 men can measure more than 8 traverse lines in 8 hours. (Range 1 to 20 miles.) Error less than ±4 inches or 10 cm ± two millionth of the distance.

SENSITIVITY:
The Geodimeter is so sensitive that expendable "Skotch-Lite" tape on stakes can be used to accelerate highway staking.

ECONOMY:
Only one man operates a Geodimeter, a second man moves reflectors similarly to a rodmans function.

RUGGED AND CONVENIENT:
The Geodimeter is a sensitive instrument yet it is made to be portable and is extremely rugged.

DOLLARS AND CENTS:
4 or 5 surveyors cost you $20,000 to $35,000 per year. You can reduce this cost by one half while you double your work output.

Complete equipment includes Geodimeter, tripod, reflex system, and generator.

PROVEN RESULTS IN HIGHWAY PROGRAM USING GEODIMETER

Seven months ago the Highway Department of one of this country's largest states began a new measurement program utilizing the Model 3 GEODIMETER. This program ran through the winter under a wide range of conditions.
The results, after measuring 200 lines in excess of 600 miles in a seven month period:

- The GEODIMETER proved itself to the various district survey departments in terms of quantity and quality of works accomplished.
- By using the GEODIMETER they could now easily carry their traverses into mountains and obtain the best controls and results.
- Where a triangulation would normally be awkward it is no longer a problem, since the GEODIMETER is the only instrument which can be used in lake or narrow canyon areas.
- Time consuming and difficult adjustment of quadrilaterals has been eliminated (side shots can be trusted to a much higher degree and the traverse always closes).
- The GEODIMETER was subjected to rough handling, even dropped, without apparent effect.
- It was found that savings would run as high as 30% to 50% in level unobstructed terrain and it was felt that the savings would be much higher in mountainous or rough terrain as compared with conventional methods. Maintenance costs were found to be negligible.

THIS STATE DIVISION OF HIGHWAYS ESTIMATED THAT ON REASONABLE CONTINUOUS USE THEIR SAVINGS WOULD BE OVER $100,000 PER YEAR.

HOW THE GEODIMETER CAN BE USED

- City Surveying
- Base lines—triangulation arcs
- Traverse
- Photogrammetry
- Radar Calibration
- Highway and Pipeline Surveys
- Oil Surveys
- Mine Surveys
- Offshore Hydrography

Send for complete detailed report of this program, as well as complete literature on the GEODIMETER.

THE GEODIMETER CO. A Division of

BERG, HEDSTROM & CO., INC., 1170 BROADWAY, NEW YORK, N. Y.

is Puerto Rico's first treatment plant. But every town on the island except 12 has sewers (and all are served by a reliable public water supply).

The glossary committee of AIDIS, composed of sanitary engineers, got some profesisonal translating help at the convention. The outlook for early completion of the much-sought language dictionary brightened considerably.

Thomas P. Browne, export manager of The Permutit Co., New York City, was elected president of AIDIS, succeeding Rafael V. Urrutia of Puerto Rico. The VII Congress will be held in Montevideo, Uruguay, in 1960.

Ville Marie Contract Goes for $60 Million

The Foundation Co. of Canada will start work next month on the Place Ville Marie project in Montreal under a $60 million general construction contract just awarded.

A joint development of the Canadian National Railway and Webb & Knapp (Canada) Ltd., the project centers around CNR's terminal area in downtown Montreal (ENR Oct. 31, 1957, p. 44). The new contract covers construction of two office buildings 40 and 15 stories high, a shopping concourse, pedestrian plaza, three-level 900 car garage and an underground roadway. Completion is expected within five years.

I. M. Pei & Associates, of New York, and Arcop, a Montreal organization, are the architects for the project. Severud-Elstad-Krueger, New York City, associated with Brett-Ouellette-Blauer Associates, Montreal, are the consulting structural engineers.

Fiji Airport Gets Go-Ahead For Jet-Age Improvements

Readying the international airport at Nandi, Fiji Islands, appeared closer to becoming an actuality recently when the New Zealand government awarded a $7 million contract for reconstructing and extending the airport's facilities.

Contracts, awarded the British firm of Taylor Woodrow, Ltd., and the New Zealand firm of D. B. Waite, Ltd., include lengthening runways and rebuilding other sections in concrete. Completing the new design will be a new terminal building to handle the expected increase in passenger traffic.

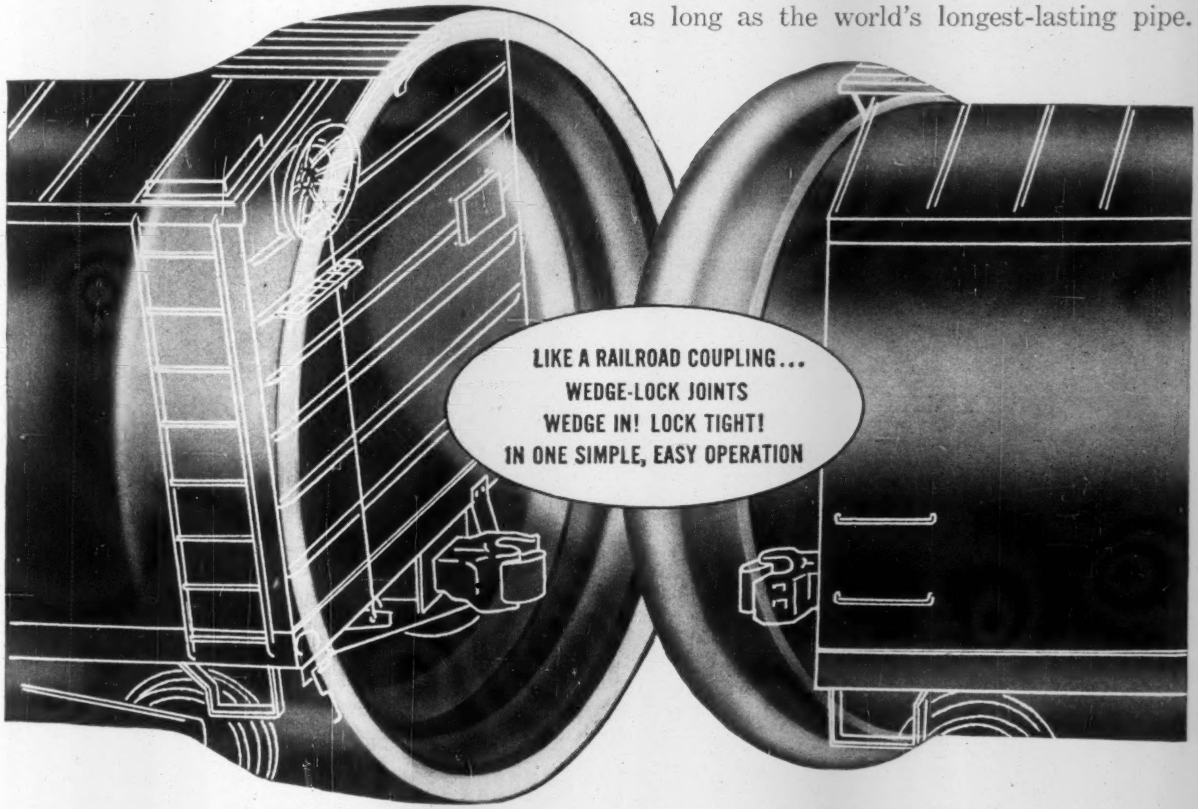
The work should be finished by the end of 1959, when Qantas Airlines is scheduled to begin operations of the Boeing 707 jetliners on flights over Pacific routes.

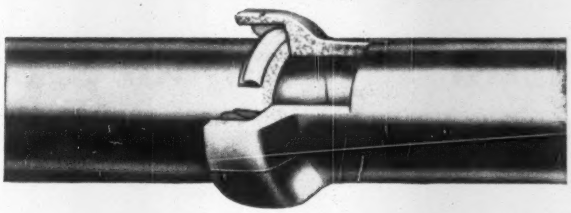
NEW **Wedge-Lock*** JOINTS

WEDGE IN!
LOCK TIGHT!

Stop Infiltration and Roots

Patented Wedge-Lock Joints wedge in and lock tight in one simple, easy operation . . . in continuous compression . . . provide the tightest line . . . stop infiltration and root penetration . . . give easier, faster installation . . . keep installation costs down . . . permit strict adherence to engineered sewer designs . . . last as long as the world's longest-lasting pipe.


LIKE A RAILROAD COUPLING...
WEDGE-LOCK JOINTS
WEDGE IN! LOCK TIGHT!
IN ONE SIMPLE, EASY OPERATION



Always specify Vitrified Clay Pipe with Wedge-Lock Plastisol Joints.

Write to Listed Manufacturers for literature or an actual Wedge-Lock demonstration.

*Patented. T.M. Reg. U.S. Pat. Off.

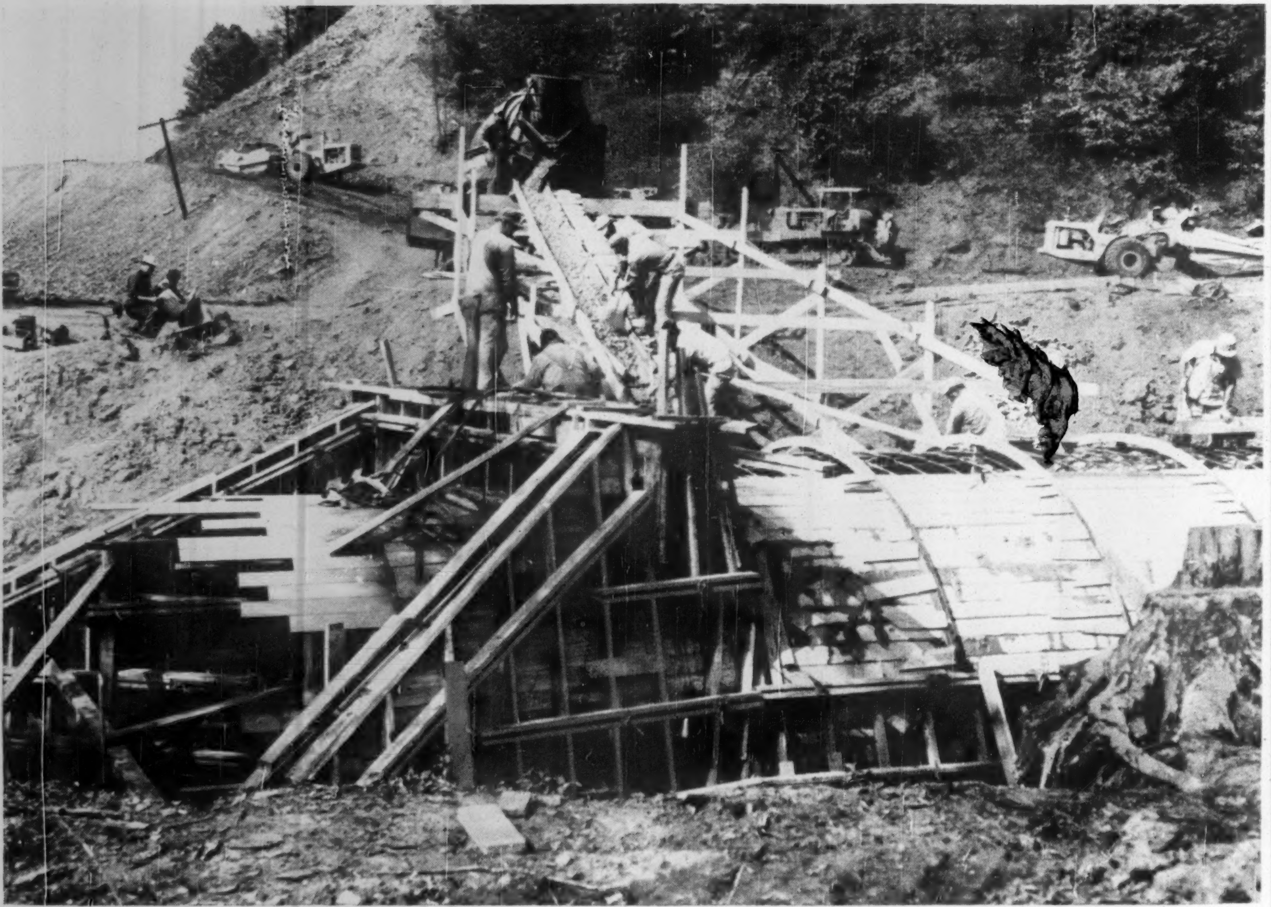
Wedge-Lock CLAY PIPE

THE FACTORY-JOINTED CLAY PIPE AVAILABLE NATIONALLY FROM LOCAL MANUFACTURERS

Order Wedge-Lock from any of these Vitrified Clay Pipe Manufacturers:

Cannelton Sewer Pipe Company, Cannelton, Ind.
Clay City Pipe Company, Uhrichsville, Ohio
The Evans Pipe Company, Uhrichsville, O.
Gladding, McBean & Company, Los Angeles 54, Cal. *(Sold under trade name, "SPEED-SEAL")*
The Logan Clay Products Company, Logan, Ohio
Oconee Clay Products Company, Milledgeville, Ga.
Pacific Clay Products, Los Angeles 54, Calif.
Pine Hall Brick & Pipe Company, Winston-Salem, N.C.
Pomona Terra-Cotta Company, Greensboro, N.C.
The Robinson Clay Product Company, Akron 9, Ohio
The Stillwater Clay Products Company, Cleveland 16, Ohio

WLC-158-31



When a creek obstructs a 3½-mile road project, move the creek! That's what S. Gavlik, Contractor, did to relocate Route 422 near Indiana, Pennsylvania. The project, let under the Federal Highway Program, included three sub-surface concrete structures to carry off surplus water from the creek. Photo above shows concrete being poured for one of the three sub-surface structures. Gulf has served Gavlik for years.

Moving a creek . . . building a road . . . or dredging a channel? On any project . . .

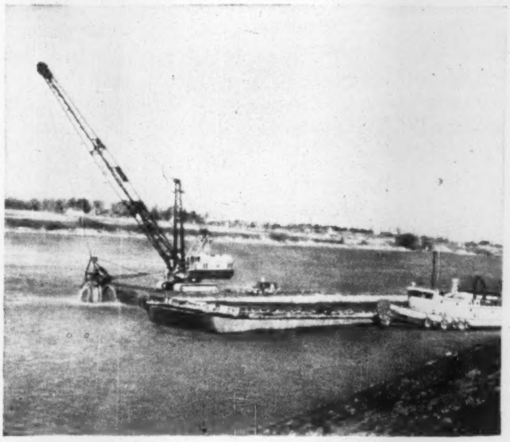
GULF CAN HELP YOU

You benefit three ways when you depend on Gulf for your fuels and lubricants. Here's why:

- You're sure of prompt delivery. Fifteen hundred strategically located warehouses—in 32 states—provide an unfailing supply of the fuels and lubricants you need.
- Your Gulf Sales Engineer will be on the job to help your operating and maintenance men get most efficient use of petroleum products. And he's backed by 1300 Gulf scientists and engineers at Gulf Research Center.
- Gulf quality fuels and lubricants insure best performance from your equipment . . . help you avoid mechanical delays. You'll have a smoother-running job . . . and lower operating costs . . . when you GO GULF.

One of the early jobs to be let under the Federal Highway Act was the relocation of Route 66 at Mamont, Pennsylvania. This job, which involves building an overpass over Route 80, was awarded to Ralph Myers Contracting Corporation of Pittsburgh. In the photo above are H. H. Hossler, Gulf Sales Representative, and Marion Hoke, Superintendent of Ralph Myers Contracting Corporation, on the job site. Myers depends on Gulf products to help prevent mechanical delays.

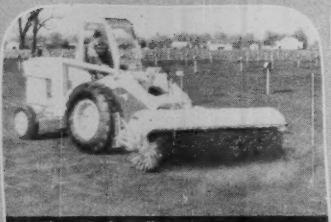
Dredging the South Cornwall Channel, a vital link in the $900,000,000 St. Lawrence Power-Seaway Project, is being done by S. J. Groves & Sons Company of New York City. Groves estimates that they will remove about 1,800,000 cubic yards. Tug and dragline use clean-burning Gulf Diesel fuel.



On the St. Lawrence Power-Seaway Project, one of the numerous trucking assignments of McConville, Inc., of Ogdensburg, New York, is hauling piling from Massena Intake. McConville is one of the many contractors on the St. Lawrence Project who knows he can count on Gulf performance and service.

GULF OIL CORPORATION
Department DM, Gulf Building
Pittsburgh 30, Pa.

Davis 210 Backhoe on Work Bull 1001 has its own backfill blade; same machine handles digging and backfilling.



The Work Bull 1001 as a rotary broom has 96" swath, 30° left and right hydraulic angle control.

Work Bull 202 and Davis Loader-Backhoe have been integrated for maximum efficiency.

Stretch Dollars – Save Manpower with equipment that does more . . .

WORK BULL 1001

CONVERTS INTO EIGHT DIFFERENT MACHINES AND OUT–PRODUCES EXPENSIVE SINGLE-PURPOSE EQUIPMENT

UNEQUALLED VERSATILITY The Work Bull 1001 obsoletes single-purpose machines that sit idle most of the time. This top-quality, 60.3 h. p. rig converts from a 7/8 cubic yard Loader to a Pick-up Sweeper . . . to a Backhoe (with its own backfill blade) . . . Fork Lift . . . Crane . . . Angle Dozer . . . Rotary Broom . . . and back to a Loader and Scarifier right in the field. Each performs so efficiently you will think it is intended for just that one purpose.

INSTANT REVERSING WITHOUT SHIFTING To change direction of travel on the Work Bull 1001 you simply switch your foot from the forward acceleration pedal to the reverse acceleration pedal. No gears or levers to move. This, plus power steering, torque converter, five-speed transmission in either direction, and left and right brakes lets you work circles around other machines.

43° ROLLBACK AT GROUND – DIRECT LINE THRUST You actually get "bull-dozer" action when digging plus more breakaway. Special shock load absorbers reduce spillage and cushion load in rough terrain. Also has "float" position so attachment can ride over the surface on which it is working.

LOW PACKAGE PRICE It costs so little to own a Work Bull 1001. Select the basic unit and whatever attachments you need. It will cost you less than what you normally pay for a single-purpose machine.

OTHER POWER MATCHED MASSEY-FERGUSON EQUIPMENT include the Work Bull 202 (40 h. p.) Tractor, Work Bull 303 (54.5 h. p.) Tractor, Work Bull Fork Lift, Davis Loader and Backhoe, plus a multitude of integrated attachments for each basic unit.

For information on the complete Massey-Ferguson line ask for Brochure G-4. For specific information on the Work Bull 1001 ask for Brochure W-1. ***Write Massey-Ferguson Industrial Division, 1009 South West Street, Wichita 13N, Kansas.***

MASSEY-FERGUSON
INDUSTRIAL DIVISION

King-Size Rotary Compressor

Le Roi now has available a 1,200 cfm portable rotary air compressor, believed to be the world's largest of this type.

The twin-unit is rated at 1,200 cfm of free air compressed to 100 psi. It is designed to provide air power for tunnel jobs, pile driving, quarry drilling, four-drill pipeline rigs and multiple drill shaft jumbos.

The two-stage, oil-cooled, sliding vane type compressors, powered by two diesel engines, are said to provide great flexibility of cfm output. Mounted on a welded steel frame with four 7.50x20, 10 ply tires, the model 1200RD2 has a good ratio of weight to cfm of air delivered with dry weight of 14,700 lb. It is 14½ ft long, 8 ft high, 7 ft 11 in. wide and has an 18 ft turning radius.

It operates at rated output speeds of 1,800 rpm for the compressors and 2,000 rpm of the engines. The compressors are coupled to the engines with hydraulically actuated clutches. Each has a 100% capacity control that matches air supply to air demands within a pressure range of 10 psi, according to the manufacturer. One combination of air receiver-oil separator is used.

Each unit has independent controls and can be operated separately for 600 cfm delivery. Each rotor has double-row ball bearings at the gear end and roller bearings at the opposite end, allowing "growth" of the shaft and cylinder during temperature variations and stabilizing linear movement of the rotor shaft.

Positive gear-type oil pumps are directly driven off the high pressure rotor shafts and are easily removed for inspection through the rear panel. Oil for lubrication and cooling is stored in a reservoir located at the rear of the unit at the lowest point in the oil system.

Radiator-type oil coolers are located immediately ahead of the engine radiators and compressor oil temperature is thermostatically controlled.

Safety protection includes automatic shutdown of engines and compressors in the event of excessive discharge temperature, high engine coolant temperature, or low engine oil pressure. Le Roi Div., Westinghouse Air Brake Co., Milwaukee 1, Wis.

New Rotary Compressor Is Positive Displacement Unit

A new line of rotary compressors is the first U. S. built rotary type using the positive displacement principle. The stationary compressors rival the efficiency and stability of reciprocating machines while matching the compactness and low maintenance of centrifugals, according to the manufacturer, Fairbanks, Morse & Co.

The compressors have a standard capacity range of 800 to 13,000 cfm. They are designed for continuous heavy-duty industrial service handling air, gas or vapor.

Municipalities will find the units suitable for use as blowers in sewage aeration processes.

Compactness of the new design will have the advantage of permitting savings in weight and floor space and, at the same time, reduce foundation and installation costs.

The compressor is a two-impeller, helical-lobe type, axial-flow, rotary machine. One impeller is powered, the second is turned by a cushion of compressed gas. There is no metal-to-metal contact between impellers, or with the surrounding casing. This makes it unnecessary to lubricate the impellers.

As the impellers rotate, they create an intake suction comparable to the suction stroke of a reciprocating piston. Further rotation isolates the interlobal space from the intake and the intermeshing lobes reduce the volume and compress the gas. As the leading edges of the lobes pass the stationary edges of the discharge opening, compressed gas is forced into the discharge line.

Because of its high operating speed, the rotary compressor can be driven by an induction or synchronous motor, diesel or natural gas engine, or steam or gas turbine.

This compressor is based on a Swedish design that has seen European service. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.

New Vibratory Compactor Delivers 4,000 lb Force

The Powr-Pactor, a self-powered vibratory compactor, is designed with variable frequencies of from 2,400 to 7,000 vpm and a compacting force of up to 4,000 lb. This one-man vibrator is driven by a 6 hp air-cooled motor.

Its ⅝ in. alloy steel compacting plate has 12x18 in. of compacting area. When equipped with rollers and water-feed attachment, the machine is ready for asphalt work.

The complete unit weighs 250 lb and the operator's handle is adjustable for height. Powr-Pactors also are available powered by a 3 hp 220/440 v electric motor. Maginniss Power Tool Co., 154 Distl Ave., Mansfield, Ohio.

(*New Products continued on page 146*)

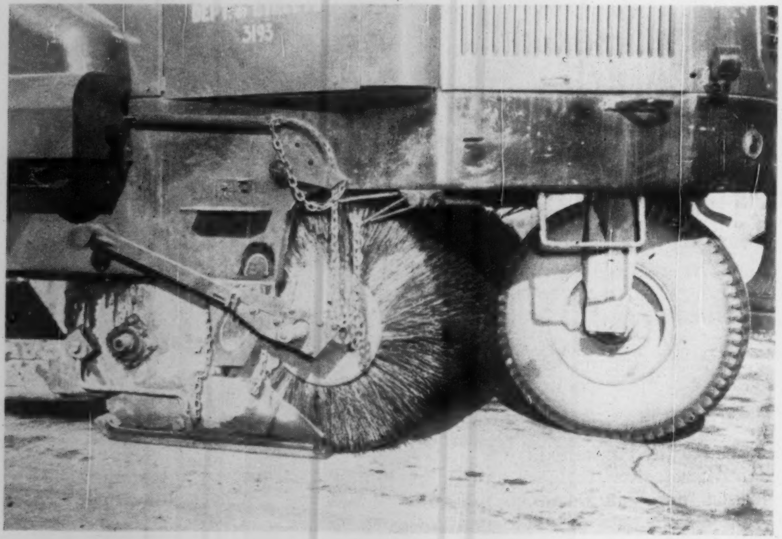
Jet Conveyor Stockpiles at High Speed

A new "jet" conveyor will load or unload sand, earth, mud, cement, grain, corn or rubbish at the rate of 60 tons per 60 minutes for a distance of 60 ft, according to the manufacturer.

Manufactured in Holland, the unit is said to be most suitable for stockpiling of materials such as in sand and gravel yards.

Material feeds between two fast moving flexible conveyor belts one above the other. The upper belt has herringbone type dividers that add to the momentum of the moving materials.

The unit can be supplied with electric motor or gasoline engine. CONTRACTORS SUPPLY CORP., 44-72 11TH ST., LONG ISLAND CITY 1, N.Y.



Nylon Bristles Used in Rotary Sweepers

"Tynex", a man-made bristling material widely used in household and personal brushes, is finding new application in street and highway rotary sweepers.

The nylon monofilament recently was tested in mechanical sweeper brooms and was found to go for about 4,000 miles before rebristling was needed. This compares to a reported life of about 200 miles for vegetable fiber brooms.

The new brooms are said to pick up all kinds of litter from fine silt to whole bricks. They also are recommended for use in snow removal. E. I. DU PONT DE NEMOURS & CO., WILMINGTON, DEL.

A Single Power Source For Multi-Arc Welding

A power source unit that serves several welders and occupies considerably less space than a group of single-operator welding sets is now on the market.

A.O. Smith 750 or 1,500 amp, direct-current, constant-voltage power source units are used in conjunction with series resistance grids that control output and provide necessary welding characteristics. The 1,500 amp set (Model 15000 CP) supplies power for 15 to 40 men; the 750 amp unit accommodates about half as many.

The units can be used both in the field and inside for arc welding, tack welding, stud welding, air gouging and inert arc welding. The welding operator can adjust his heat directly from his work position, no matter how distant the power source, by locating the series grid near the work. Power-connection and welding-lead problems can be reduced by about 80% as compared to single operator welding, according to the manufacturer.

• **Specifications**—The units are compact, have silicon rectifiers, and have weatherproof housings constructed of 16 gage steel. Over-all voltage regulation assures the same arc current for a given series resistor setting regardless of how many arcs are operating.

The unit is made for operation in temperatures up to 104 F. Both thermal and magnetic protection against overload are supplied so that either long-term overloads or instantaneous short circuits will shut down the unit with no damage to the rectifier or internal components. All transformers are silicone insulated to withstand moisture.

The grids are connected in series with the output of the Model 15000 CP in such a way that one terminal goes to the ground connections of the work; the other terminal goes to individual grid resistor boxes. The connection to the power source plugs into the rear of the resistor box; the operator's whip cable with electrode holder, into a plug on the front.

Operators grids are available packaged singly or six in a rack.

If the A.O. Smith power sources are purchased to replace motor-generator sets, existing wiring systems can be used and installation costs kept low. The units can be wired in parallel and are claimed to be less expensive than if a number of single-operator welding machines were purchased. A.O. SMITH CORP., WELDING PRODUCTS DIV., MILWAUKEE, WIS.

(*New Products continued on page 151*)

Can you afford to use obsolete equipment ...to conserve cash?

When you split your fleet into working units, do you have uniform, top-production efficiency from each unit? . . . or do you have a few slow-moving tractors and scrapers that can't keep pace with your newer machines? Do you know what these production lags cost you in yardage . . . and profits?

When skies clear after a bad-weather break, and you line up your fleet to move pay-dirt, do your "old-timers" fail to deliver just when you need them most? Have you figured how much this costs in lost yardage? . . . in idle manpower? . . . in shrinking profits?

Every production tool has its "point-of-no-return." When it becomes subject to frequent repair . . . or if its speed is too slow to keep up with companion equipment . . . it is time to check its earning value. It is time, in fact, to trade it in on a new, fast, higher-production tool that can cut your costs. And *now* is a good time to trade. Use your old machine for down payment. The increased production from a new machine, added to your savings in repair of an old machine, can quickly retire the obligation . . . help to conserve cash . . . increase your profit margin.

Why not see your nearby LeTourneau-Westinghouse Distributor . . . get from him the latest facts on how fast, modern L-W equipment will soon pay for itself on your spread. It is possible that you may not even have to disturb your cash reserve in order to capitalize on bigger future profits. Certainly, it will cost you nothing to find out!

Please turn the page . . .

Top trade-in

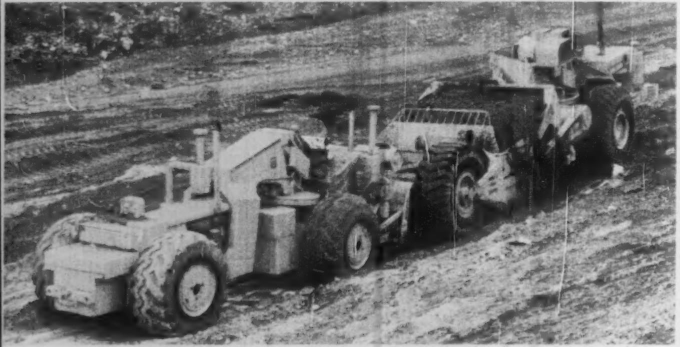
...at your LeTourneau-

To move big yardages, fast . . .
335-hp, 31.7-mph B Tournapull®
with 27-yd Fullpak® Scraper

Low, wide bowl loads faster . . . boils better . . . fills all corners . . . heaps low-void payloads. Electric controls assure top operating efficiency in any weather, minimize downtime and maintenance. Electric power-steer makes 90° turns, enables big machines to "duck-walk" out of muck and mud, and work in narrow places. L-W power-transfer differential helps keep traction on solid footing, prevents stall, maintains steady speed in toughest working conditions. Available with 335-hp Cummins diesel and Allison torque converter, or choice of 300-hp Cummins or GM diesels with step-gear transmission. *Ask for a demonstration!*

"Standard of the industry"
210-hp, 29.9-mph C Tournapull
with 18-yd Fullpak Scraper

The original C Tournapull introduced the 2-wheel prime-mover, and revolutionized earthmoving. Since those pioneer days, the C 'Pull† has been constantly improved. It is still the standard by which all other scrapers are compared. Today's 18-yard "C" is big enough to work profitably on big production, yet its ownership-operating cost is so low you can use it to advantage on one-man jobs. Available with 210-hp GM or 200-hp Cummins diesel engines, with step-gear transmission, or optional L-W power-shift torque converter. Dependable electric controls. *Trade in an old scraper on a new "C". Ask for a demonstration!*



Load biggest scrapers in seconds
with 420-hp, L-W Twin-C† Tractor
. . . cut costly tandem pushing

Want to load your biggest scrapers, *fast . . . at less cost?* Twin-C, with its 40 tons tractive weight, 4-wheel synchronized drive, and power-transfer differentials, develops 64,500 lb drawbar pull, attains forward speeds to 20 mph. It eliminates the need for tandem pushers, gives you the economy of one-man machine operation. With electric-steer, it maneuvers fast, makes 60° turns right or left, lines up quickly for direct push. Big, wide-base tires "hang-on" in soft footing, up steep grades. If you operate *big* scrapers, get the facts on how this powerful Twin-C tractor can help boost production and increase your profits!

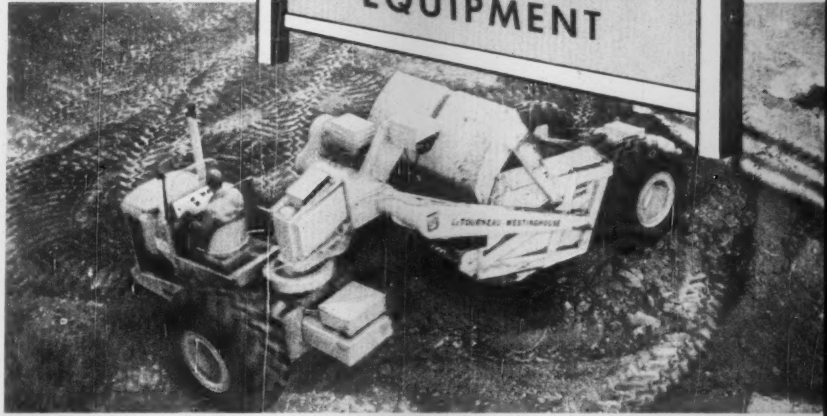
Speed-up your tractor work . . .
fast, 210-hp C Tournatractor®
can save you time and money!

On work where wide travel range is important . . . leveling scattered fill, towing compactors and "part-time" scrapers, cutting drainage ditches, stockpiling, maintaining haul roads, push-loading, doing dozens of chores over a wide work area . . . Tournatractor can save you time and money. And it travels job-to-job at speeds to 17.2 mph, over highways and cross-country, without the aid of truck-and-trailer. It will pay you to balance your tractor fleet. Use your big crawlers on short-haul pushing and dozing . . . use fast, rubber-tired C Tournatractor for scattered odd-job assignments, clean-up, and finishing. *Ask for demonstration!*

values NOW

Westinghouse Distributor...

Your old machines *will never be worth more* than they are today! And they may be costing you money in repairs and availability. The extra production you can get with new machines — every hour, every day — can mean more favorable bids, steadier work, lower maintenance, higher profits. To get most for your money, invest *now* in the modern, efficient L-W equipment shown here.



Cut costs on scattered jobs
with "Handyman" D Tournapull
. . . 138 hp, 29.5 mph, 9-yd capacity

Fleet owners find this multi-purpose "D" profitable for odd jobs and close-quarter work, where big machines waste time and run up costs. Works alone or in fleets, self-loads or can be push-loaded. Makes 180° turns in 24'3" . . . eliminates need for turn-around areas. "D" is used universally for clean-up, for building driveways, leveling home sites, terracing, ditching, completing many types of small contracts. Powered by 138-hp GM diesel, with step-gear transmission and power-transfer differential. Instant, electric controls. Roadable anywhere without permit. Now is a good time to talk "deal" on a "D". *Ask for demonstration!*

For low-cost, off-road hauling
. . . L-W Tournapull Rear-Dumps
in 11, 22, and 35-ton capacities

Wide bowl, low rear-entry, makes loading easier, *faster*. Machines make continuous U-turns in less space than their own length . . . in about ⅔ their length when in dump position. This saves time positioning at shovel . . . makes it possible to work in tight quarters. Machine dumps clear over banks . . . eliminates dozer clean-up . . . pulls away from edges safely, with front drive-wheels always on firm footing. Frameless construction eliminates most ordinary trouble spots . . . reduces maintenance. Rear-Dumps easily interchange with scraper units behind Tournapull prime-movers. *Get full details!*

Match power to load with
7 sizes L-W Adams† graders
. . . do more work per $ invested!

Select the *right* grader for your particular need from this most complete range of sizes: Biggest in line is L-W POWER-*Flow*® 660; 190 hp with torque converter, infinite speeds to 27.4 mph. Second in size is the "660"; 160 hp, 8 forward speeds to 26 mph. Next, the POWER-*Flow* 550; 135 hp with torque converter, infinite speeds to 25.8 mph. Three medium sizes: "550", "440", and "330" — 123, 115, and 80 hp — all with constant-mesh transmission, 8 forward speeds to 25 mph. The utility model "220" provides 60 hp, 5 speeds to 18.3 mph. *(Creeper speeds optional on all gear-shift models.) Ask for demonstration!*

† Trademark

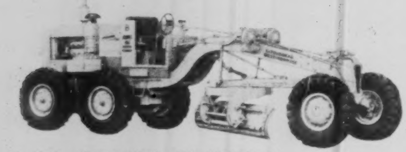
Please turn the page . . .

TOURNAPULLS (27, 18, 9 cu yd)

REAR-DUMPS (35, 22, 11 tons)

210-hp TOURNATRACTOR

420-hp TWIN-C TRACTOR



L-W ADAMS GRADERS
(190, 160, 135, 123, 115, 80, 60 hp)

MAIL TODAY!
Request for demonstration

(Mail to your LeTourneau-Westinghouse Distributor or to factory at Peoria, Ill.)

Gentlemen: Please make arrangement to demonstrate for us the machines checked here. We may need tools of this size on or about (date)................

Tournapulls: ☐ B ☐ C ☐ D
Rear-Dumps: ☐ 35 ☐ 22 ☐ 11
(tons capacity)
☐ C Tournatractor ☐ Twin-C Tractor

Motor Graders:
POWER-*Flow* ☐ 660 ☐ 550
Constant-Mesh ☐ 660 ☐ 550
☐ 440 ☐ 330
☐ 220 Sliding Gear

NAME ....
TITLE ....
FIRM ....
ADDRESS ....
CITY ....
STATE or PROV. ....
PHONE ....

(It is understood that we are under no obligation.)

Litho in U.S.A. LA-1621-DC-4

To conserve cash reserve ... make sure you get greatest earning capacity for your machinery money

Great improvements have taken place during the past few months in the pace-setting line of LeTourneau-Westinghouse earthmoving tools. Wider selection, bigger capacities, greater speed, lower up-keep . . . advantages engineered to help you cut costs and UP your profit margin. So many advantages, in fact, that we believe the only way we can do them justice is by actual demonstration.

Fill out and mail "request for demonstration"

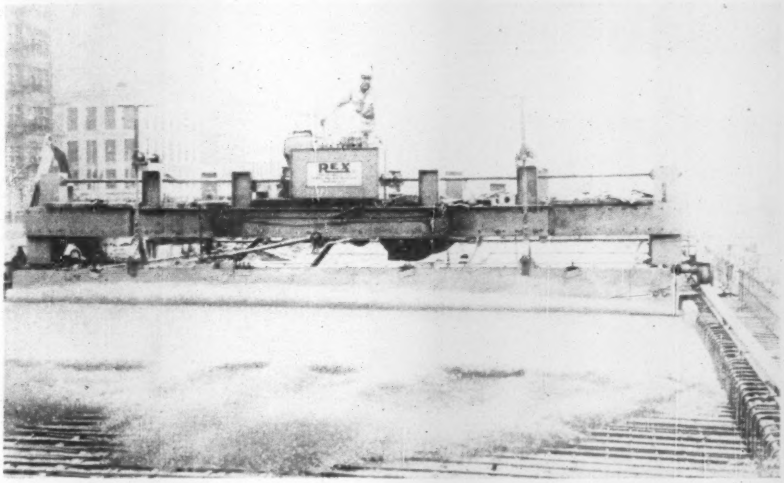
Address it to your nearest LeTourneau-Westinghouse Distributor, or send it to the factory and it will be forwarded to the L-W Distributor best situated to give you prompt service. *You will be under no obligation, so do it now!*

"Get-ahead" with the years-ahead L-W line

LeTourneau-Westinghouse originated the two-wheel, electrically-controlled, rubber-tired prime-mover . . . and was first to introduce a rubber-tired, heavy-duty tractor. More than 12,500 of these machines, working in all kinds of conditions in all parts of the world, have established unequalled records for dependability and low-cost production. Same is true of the pioneer Adams line of motor graders, up-graded in recent years by L-W research and engineering. So, "get-ahead" with "years-ahead" L-W machines . . . improved constantly for your benefit.

Before you buy your next earthmoving machine, see your L-W Distributor. Get his answers on *what machines* work best, on *which jobs*, at *lowest-net-cost* to you. You can depend upon straight answers! He wants to merit your confidence.

LeTOURNEAU-WESTINGHOUSE COMPANY
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company
"Where quality is a habit"

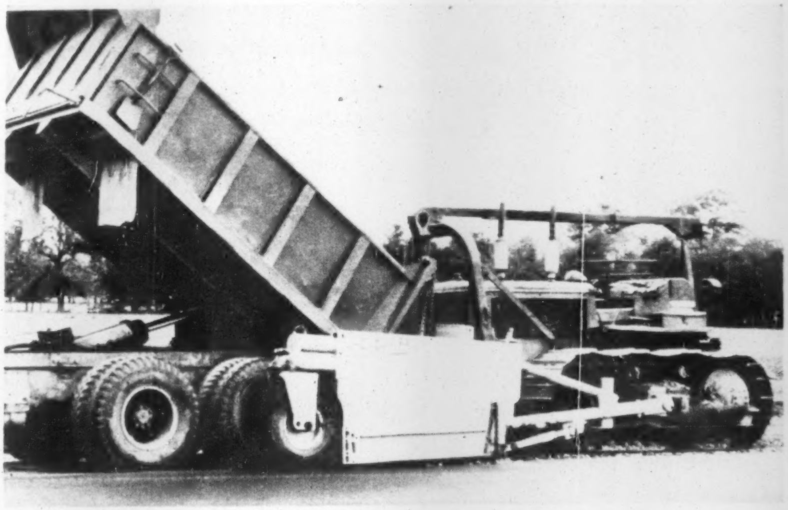


Finisher Built for Bridges or Roads

A concrete finisher for bridges has been developed, incorporating the design and features of a road finisher.

Produced on a made-to-order basis, the bridge finisher is tailored to customer specifications. A claimed advantage of the finisher is that it can be converted into a standard road finishing machine with a minimum of labor.

The machine is adjustable both in elevation and in frame width and in most cases one machine can take care of most width requirements. CHAIN BELT CO., MILWAUKEE 1, WIS.



Base Paver Hooks to Crawler-Tractor

A base paver attachment, designed for standard crawler-type tractors (that have sufficient power for its operation), is being marketed now. The attachment—Model B-160—features an oscillating screed that is said to promote accurate depth and level control plus quick crown adjustment, along with eliminating voiding and segregation.

Other features claimed for the attachment are high capacity, easy depth adjustment, flexible width adjustment, crown adjustment and an easy loading hopper. The machine is intended for the contractor whose base paving requirements do not warrant purchasing a complete self-powered base paver. BLAW-KNOX CO., 300 SIXTH AVE., PITTSBURGH, PA.

(New Products continued on page 152)

Save time and money on construction jobs

The reference aid that helps you solve your toughest construction problems

With the construction work that lies ahead for every engineer, it is only up to you to assure yourself of superior workmanship — assure your work of the finest structural qualities — by providing yourself with this revision of the famous Hool and Kinne Library — the books which for years have been providing structural engineers with the facts they need on every problem concerned with the design and construction of civil engineering structures.

HOOL AND KINNE'S

Structural Engineers' Handbook Library

Revised by R. R. ZIPPRODT,

And prepared by a staff of sixty-three well-known engineers, each a specialist in his field.

6 volumes; 3763 pages; 2719 illustrations; 63 contributors

Each one of these six volumes is a complete reference in itself on some aspect of structural engineering. The library

▶**COVERS** the how and why of foundation and substructure design and construction, the general theory of structural members, the detailed design of such members, and the design of their connection with other members.

▶**EXPLAINS** the principles of statics, reactions, moments and shears in beams and trusses, influence lines, methods of computing stresses in lateral trusses and portable bracing.

▶**GIVES** details of design and construction of steel, timber, and concrete structures of all types.

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We invite you to inspect these books for yourself, because we know that that is the one way you can realize their true value to you, and to the jobs that you do. You want to back up your own knowledge with sure, easy-to-get facts, and you want to make your workmanship worthy of your best time and effort. Therefore, the best investment you can make is to add to your own experience the tested working aids given in this dependable reference library.

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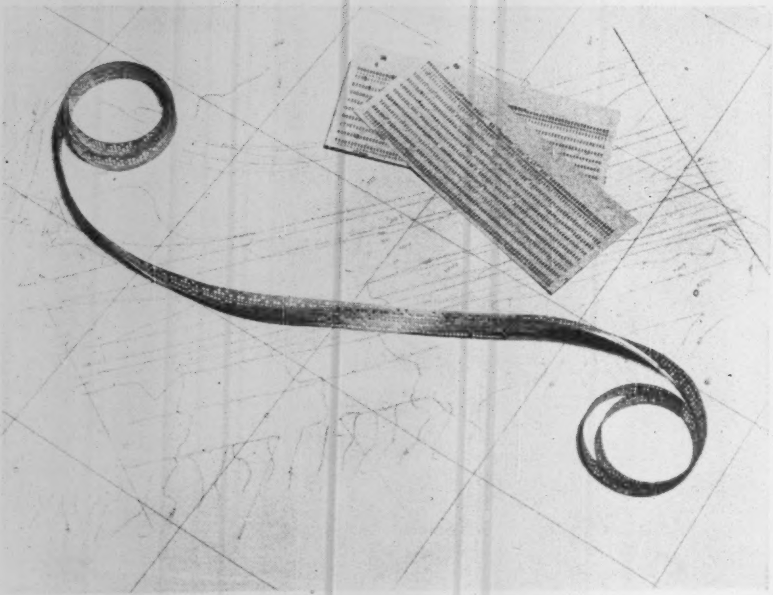
Dependable Cross Section and Profile Data Now Delivered Quickly By Aero Digitizer



New Method Reduces Cost, Time

Now highway engineers can obtain basic design and earth work quantity estimates with AERO's new digitizing instrument. The automatic Digitizer takes essential engineering information from aerial photos and records it on punched cards or tape. It is speedy, reduces cost, and eliminates the possibility of recording errors.

The terrain card or tape record can be prepared for use in the engineer's own computer—or AERO will complete the computing operations. AERO also produces cross section drawings by using the cards or tapes in electronic plotting equipment.

For more information on this important new engineering service, write or phone AERO today. Our photogrammetric engineers will be pleased to meet with you.

AERO SERVICE CORPORATION
Philadelphia 20, Pa.
Oldest Flying Corporation in the World

Lightweight Compactor Rocks While It Rolls

A tandem roller, manufactured in Germany and known as the SW, has been demonstrated recently in the U. S. In particular, the demonstration was in compacting a bituminous binder course. In this test, the 6 in. thick hot mix was fully compacted in one layer. Also, subgrade, base and seal courses of crushed stone and fines were compacted in superior fashion, according to observers.

Outstanding feature of the roller is the vibrating mechanism that is adjustable by the operator from about 2,000 to 3,500 vibrations per minute, to suit a wide range of aggregates. Thus, without the vibrator the roller acts as a 4 ton compactor; with vibration, it has compactive effect up to 20 tons, tests reveal. Important to efficient operation is the fact that the operator is fully insulated from the vibration.

Easy portability is insured for the roller by its small size—roller width of about 40 in. Further, it can climb onto a truck under its own power. An air-cooled Deutz diesel engine that can be serviced in the U. S. powers the equipment. COMBINED AGENCIES CORP., 910 17TH ST., WASHINGTON 6, D. C.

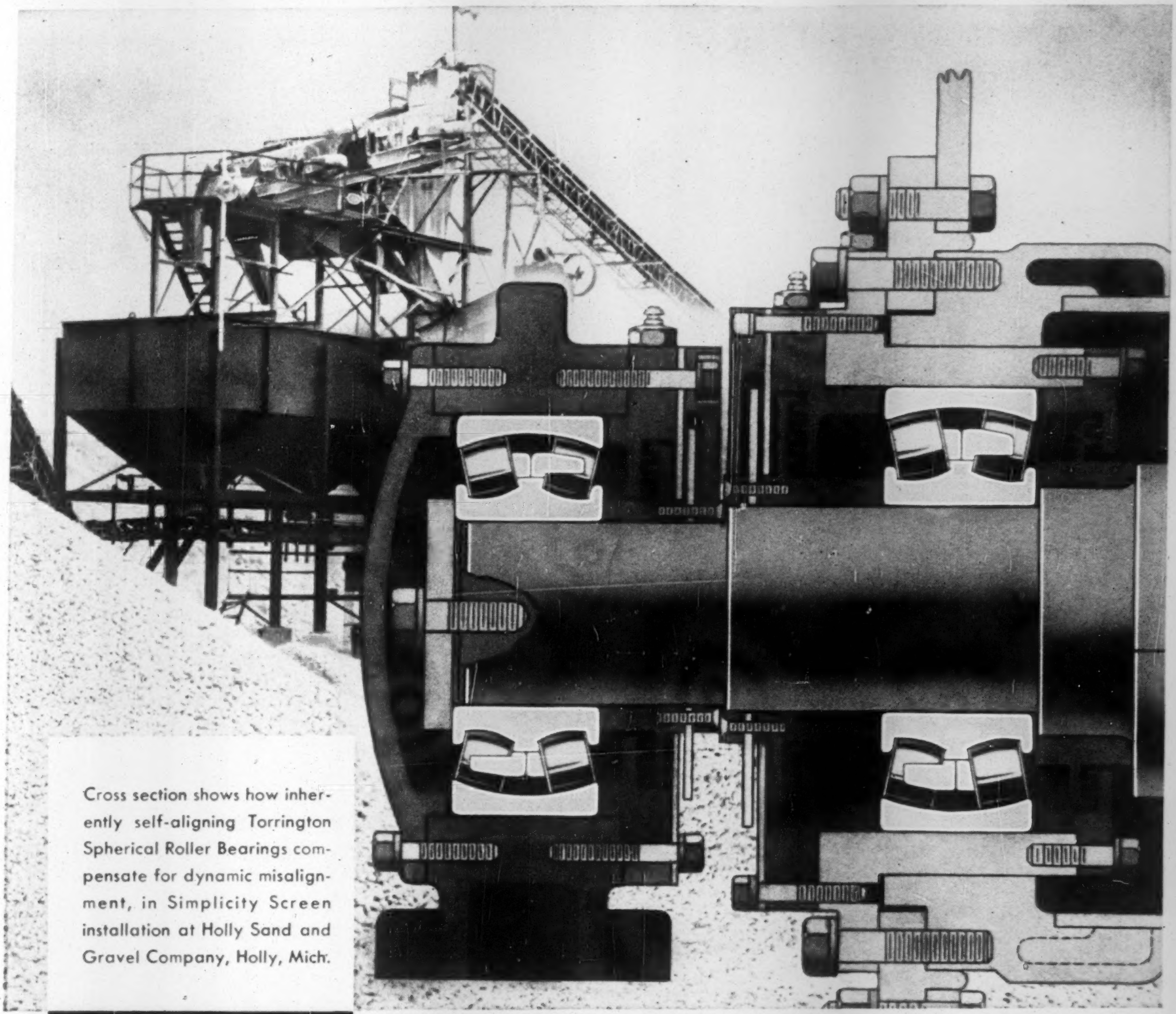
Oliver Soups Up Power; Adds New Transmission

A new line of OC-4 crawler tractors features added power, availability in either gasoline or diesel, and transmission improvements.

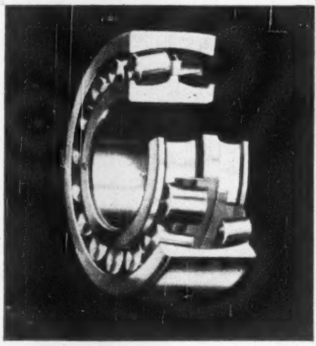
The new engine develops 29 hp in either gas or diesel model and is cited as being the smallest diesel on the market today.

An important improvement stated by the manufacturer is an auxiliary transmission that will reverse the new model and maintain the same speed in reverse as in forward speed. This operation is carried out by declutching and pulling back a lever—true for all four forward speeds. THE OLIVER CORP., 400 W. MADISON ST., CHICAGO 6, ILL.

(New Products continued on page 154)



Cross section shows how inherently self-aligning Torrington Spherical Roller Bearings compensate for dynamic misalignment, in Simplicity Screen installation at Holly Sand and Gravel Company, Holly, Mich.



TORRINGTON

Spherical Roller Bearings Roll Freely Under Shock and Eccentric Loads

Inherently self-aligning, Torrington Spherical Roller Bearings roll freely at full capacity despite deflection of equipment framing or shafts under load.

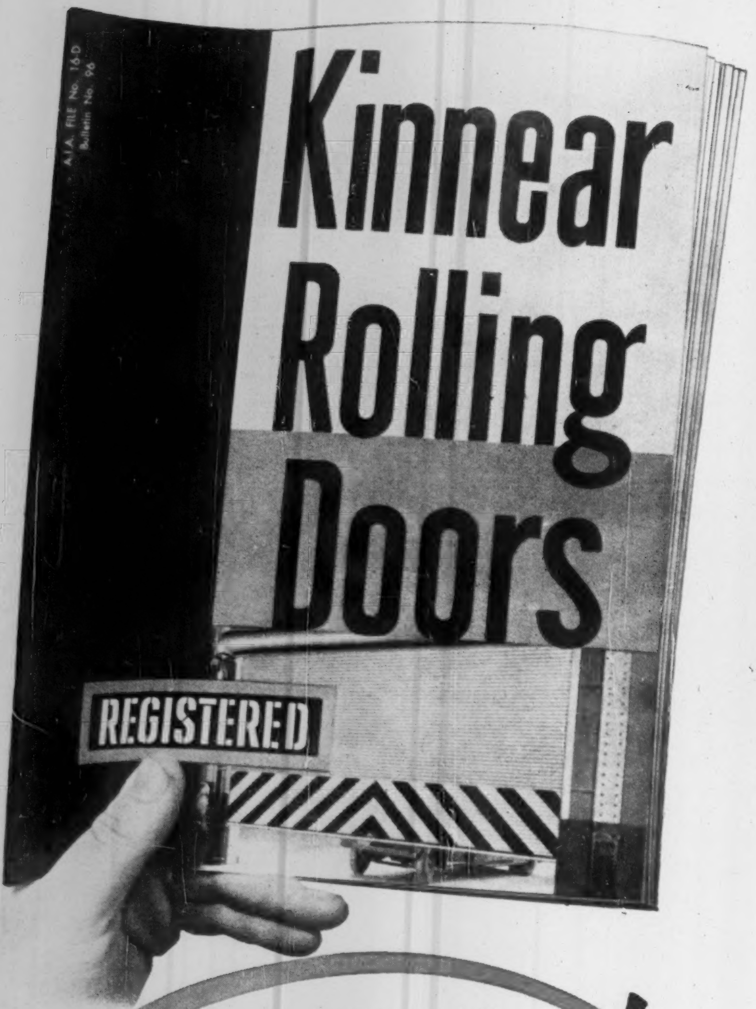
This feature contributes to smooth operation and long life in Simplicity Engineering Company Screens. Positive roller guidance by the integral center flange provides constant and uniform roller contact with the race under radial and thrust loads, reducing wear and friction under shock and eccentric loading conditions.

Construction equipment of all types benefits from the advanced design features of Torrington Spherical Roller Bearings. To secure unsurpassed performance with minimum maintenance, specify Torrington. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

TORRINGTON BEARINGS

District Offices and Distributors in Principal Cities of United States and Canada

SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • NEEDLE ROLLERS • THRUST



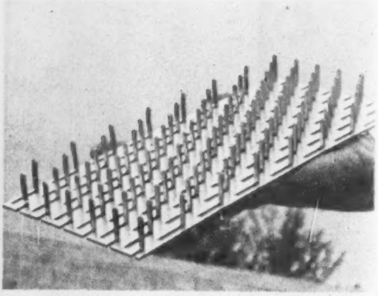
Get Action!

—The *upward action of interlocking slats that coil compactly above the opening:* That's the *action* (originated by Kinnear!) that provides an unbeatable combination of lower door costs and higher door efficiency. Kinnear Rolling Doors make all space around doorways usable at all times, open completely out of the way, give you a rugged curtain of all-steel protection against wind, weather, fire, and vandals. *Often* delivering up to 50 years or more of daily, low-maintenance service, they're also REGISTERED — all parts of every door can always be accurately duplicated from master details kept permanently in fireproof vaults. Get *all* these Kinnear Rolling Door benefits and more; write for this latest catalog, now . .

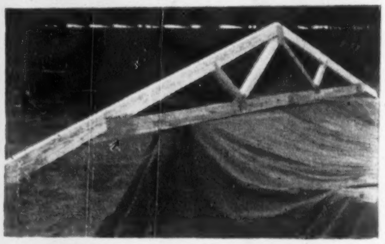
Take Action!

KINNEAR
ROLLING DOORS
Saving Ways in Doorways

The KINNEAR Mfg. Co.
Offices and Agents in All Principal Cities
FACTORIES:
1820-40 Fields Ave., Columbus 16, Ohio; 1742 Yosemite Ave., San Francisco 24, Calif.



GANG NAILS, $\frac{13}{16}$ in. long, are stamped in the 14 ga sheet steel of a new-type connector plate for wood trusses.



RIGID TRUSS connections are made with a variety of "Gang Nail" plates.

Labor-Saving Connector Speeds Truss Assembly

A new roof-framing system, called the Gang Nail Truss, has been developed to provide a sturdier and cheaper means of constructing wood roof trusses.

The system centers around a "Gang Nail" connecting plate, available in a variety of shapes and sizes, for truss joints. The manufacturer claims substantial savings can be made with the plate, which eliminates individual nails.

The new method will have particular appeal to volume builders using jig assembly on a large scale. According to the manufacturer, trusses built with the plate connector are exceptionally rigid in handling and will not loosen during erection. GANG NAILS, INC., 8410 BIRD ROAD, MIAMI, FLA.

Aluminum Tripod Is One-Third Lighter

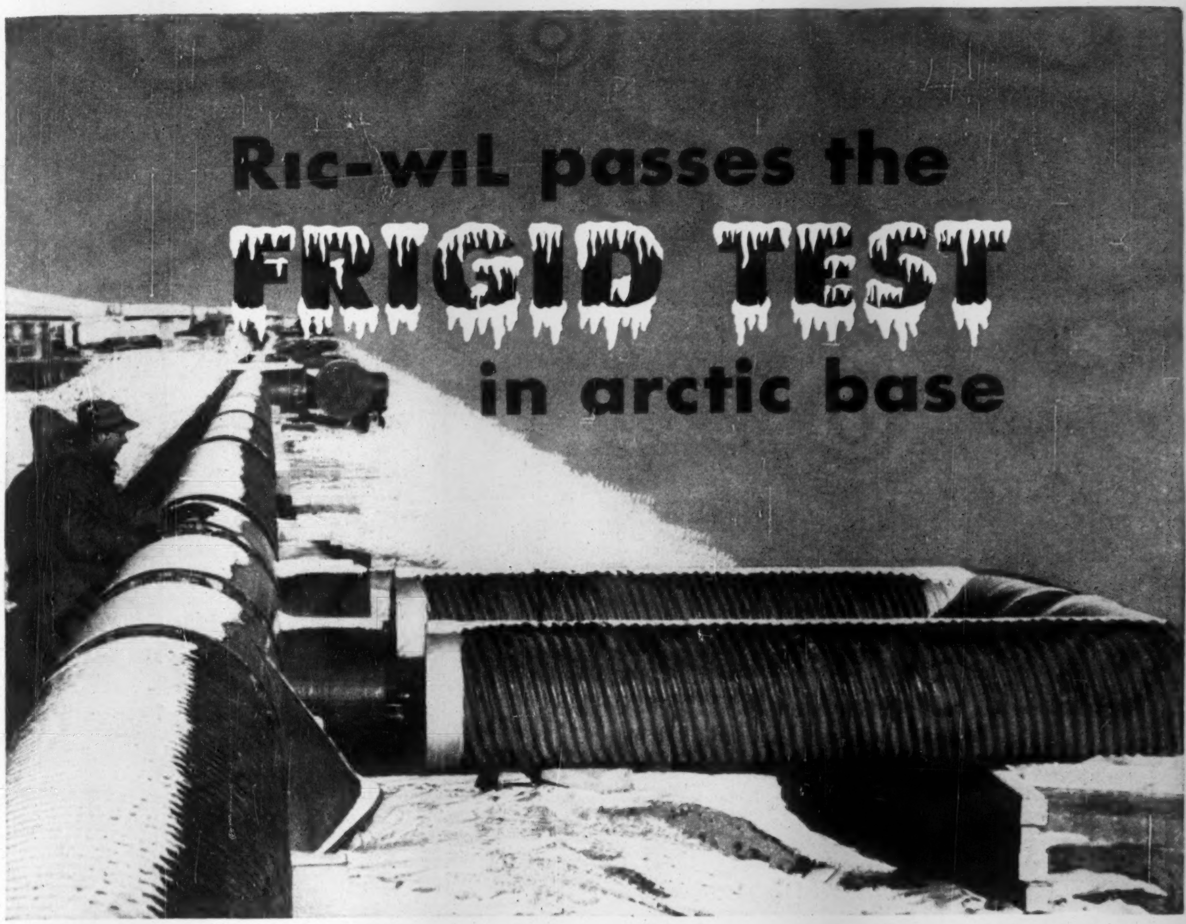
An aluminum tripod, claimed to be one-third lighter than conventional wood tripods and known as the model W-1000, is available.

The manufacturers claim durability, and ease in handling to be the outstanding features.

Its weight is 8½ lb; it closes compactly to a 36 in. length for carrying. SAFE-LOCK CO., 870 W. 25TH ST., HIALEAH, FLA.

(*New Products continued on page 156*)

Ric-wiL passes the FRIGID TEST in arctic base



Photograph courtesy U. S. Army Engineers, Eastern Ocean District.

Architect—Alfred Hopkins Assoc., N. Y.
Engineers—Metcalf & Eddy, Boston, Mass. & Guy B. Panero, N. Y.
Contractors—North Atlantic Constructors, N. Y.

The task of building the multimillion dollar Thule Air Base in Greenland confronted the Army's Corps of Engineers with temperatures of 40° below zero.

A Ric-wiL prefabricated insulated system was selected for steam and return distribution lines to feed steam from 40 boilers at 12 different locations. After more than five years of operation the complete system has operated without breakdown. Personnel who man this defense outpost work and live in comfort comparable to stateside duty . . . truly a major accomplishment considering Arctic climatic conditions.

Ric-wiL
Barberton Ohio

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. . . of Exceptionally High Thermal Efficiency

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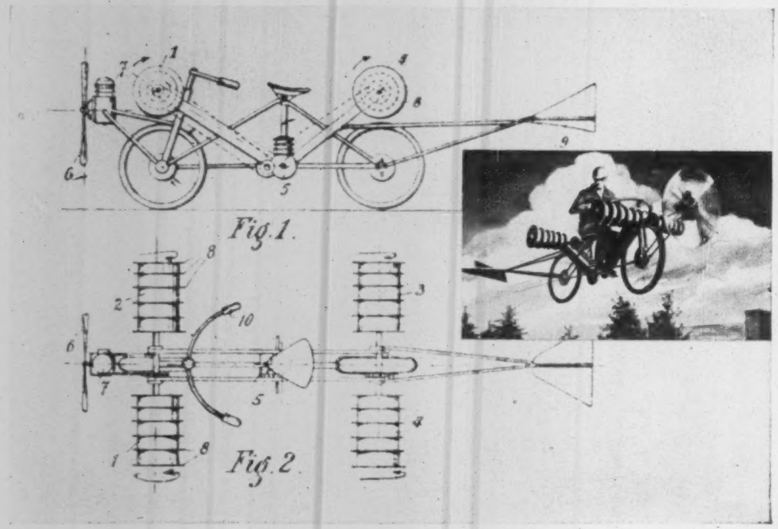
MARS outstanding design **SERIES**

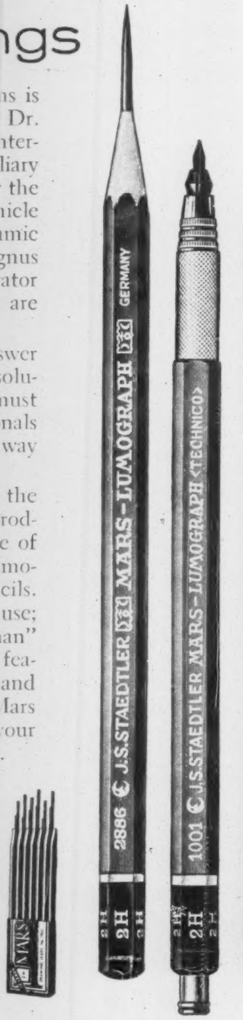


flight without wings

Getting over, rather than around, traffic jams is easy, with this flying motorcycle, says its designer Dr. Manfred Mannheimer, of Newark, N. J. Encountering heavy traffic, it quits the ground. An auxiliary motor rapidly rotates four cylindrical "wings." By the action of the "Magnus effect" these lift the vehicle into the air at 15 mph with 70 hp. The aerodynamic principle involved was discovered by Gustav Magnus in 1858. The cycle's tail-end has a rudder and elevator fin for steering during flight; the rotary wings are telescoped for surface travel.

Whether or not this design will be the answer to traffic congestion, it certainly is an ingenious solution. Aloft or aground, all engineering solutions must originate on the drafting board. And only professionals know how the best in drafting tools smooths the way from dream to practical project.

In pencils, of course, that means Mars, long the standard of professionals. Some outstanding new products have recently been added to the famous line of Mars-Technico push-button holders and leads, Lumograph pencils, and Tradition-Aquarell painting pencils. These include the Mars Pocket-Technico for field use; the efficient Mars lead sharpener and "Draftsman" pencil sharpener with the adjustable point-length feature; Mars Lumochrom, the color-drafting pencils and leads that make color-coding possible; the new Mars Non-Print pencils and leads that "drop out" your notes and sketches when drawings are reproduced.


2886 J.S.STAEDTLER MARS-LUMOGRAPH GERMANY
2H
1001 J.S.STAEDTLER MARS-LUMOGRAPH <TECHNICO>
2H
2618 J.S.STAEDTLER MARS-LUMOCHROM GERMANY
MARS

The 2886 Mars-Lumograph drawing pencil, 19 degrees, EXEXB to 9H. The 1001 Mars-Technico push-button lead holder. 1904 Mars-Lumograph imported leads, 18 degrees, EXB to 9H. Mars-Lumochrom color-drafting pencil, 24 colors.

J.S. STAEDTLER, INC.
HACKENSACK, NEW JERSEY

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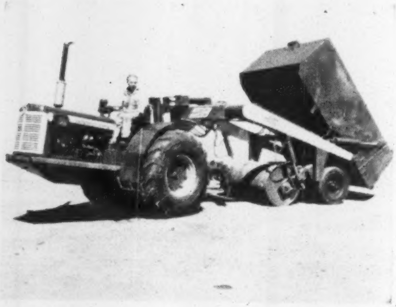


Compactor Can Serve As Off-Road Hauler

A new model compactor in which the ballast can be lightened or completely emptied in short order has been introduced. The ballast box is a dump type that eliminates the need for hand shoveling or a clam shell in removal. In addition, the ballast box allows the unit to serve as an 8 to 12 cu yd off-highway hauler.

As a compactor, the rubber rolls are used to make the first pass or two. The steel roll then can be lowered to a level even with the bottoms of the ruts formed by the tires. The high unit pressure from the steel roll then forces the ridge material down between the tire ruts to produce a uniform compaction. Compaction tires for up to 125 psi inflation pressure are available.

In spite of its 50,000 lb loaded weight, the compactor is said not to damage haul roads or soft fills, since the load is distributed evenly over eight rear wheels. It is powered by a heavy duty 88 hp International tractor, modified as a two-wheel prime mover. Seaman-Gunerson Corp., 2763 S. 27th St., Milwaukee 15, Wis.

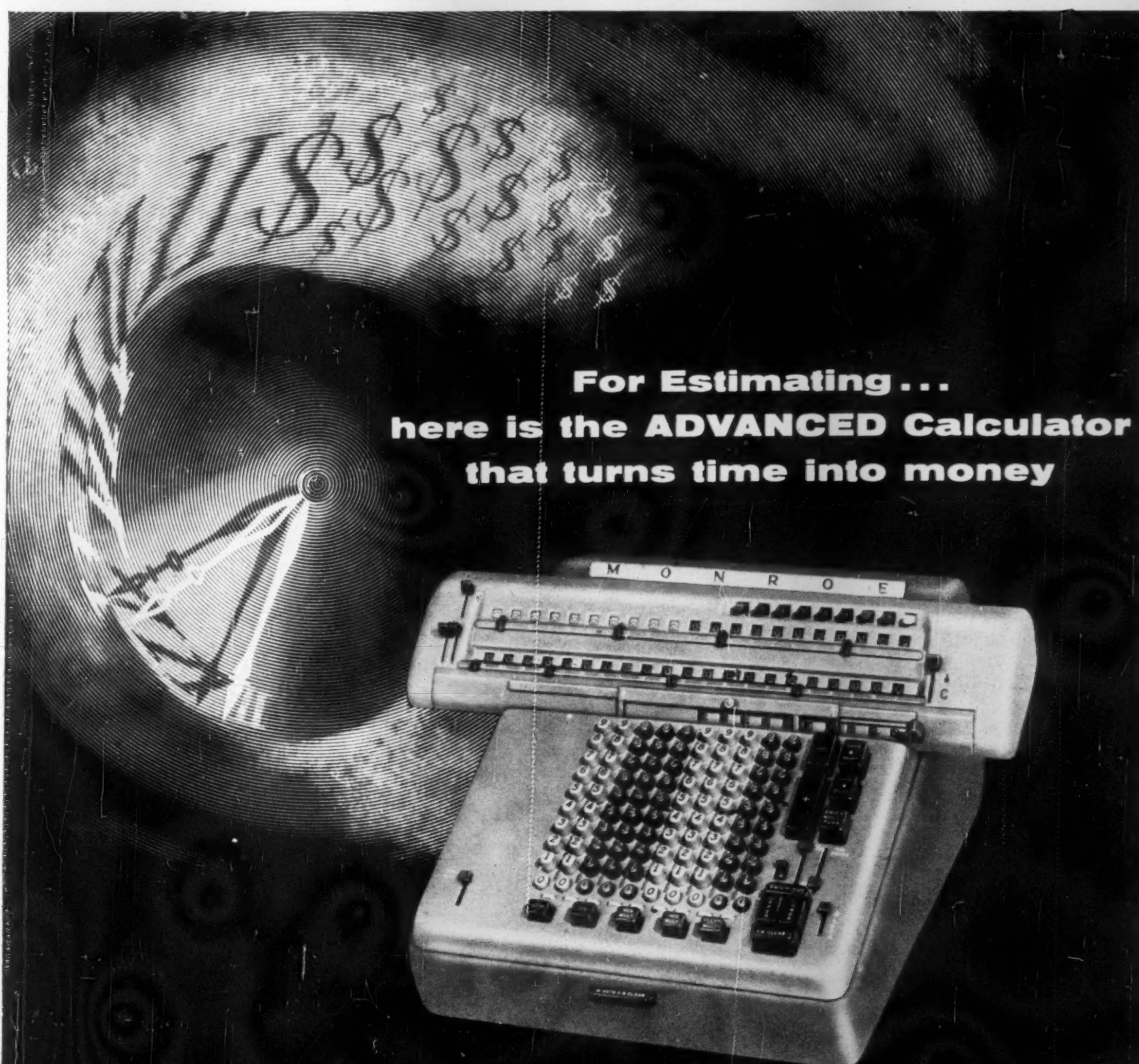
Faster Slope Measurements Are Claimed for Hand Level

A hand level equipped with the standard scales used in engineering construction and forestry—degrees, percent, topographic and chainage corrections—is available. Two reversible nickel silver arcs are positioned by loosening thumb screws to superimpose the desired scale on the others.

An internal focusing bubble magnifier in the level tube can be abjusted to the user's eye and clamped in place. No refocusing is required each time the instrument is used.

The instrument is supplied complete with a saddle leather-carrying case, belt loop and operation handbook. Price $33.00. Leopold and Stevens Instruments, Inc., 4445 N. E. Glisan St., Portland, Ore.

(New Products continued on page 158)



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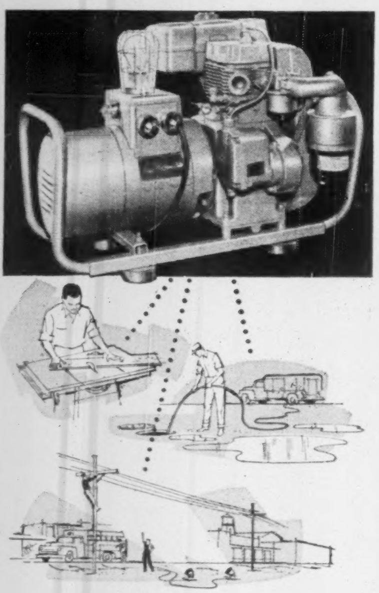

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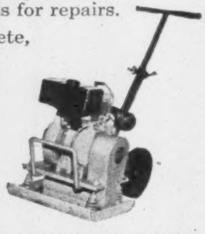
AA-7622



MODEL PP-18 POWR-PACTOR.
Up to 7,000 vpm, 4,000 lbs. adjustable force, gasoline powered.

Loader-Backhoe Unit Has Single Hydraulic Control

With the operator facing his work throughout the backhoe's 190 deg arc and controlling the loader with only one hydraulic control, the Minneapolis-Moline L-3 and L-4 Wheeloaders feature ease of operation.

For use with their models 335 and 445 industrial tractors, the manufacturers present the new units as being fast, rugged and quick-detachable for excavating, trenching and backfill work. The L-3, with a ½ cu yd capacity, has 47 bhp; the L-4 with ⅝ cu yd capacity, has 57 bhp.

On both models, digging depth is 12½ ft with a 15½ ft reach from the swing post axis. Hydraulic outriggers are individually controlled. MINNEAPOLIS-MOLINE CO., P. O. BOX 1050, MINNEAPOLIS 40, MINN.

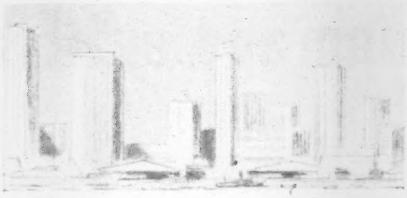
Nuclear Instrument Tests Soil and Aggregate Samples

A density and moisture measuring instrument operating on principles of radioactivity is available to soil testers.

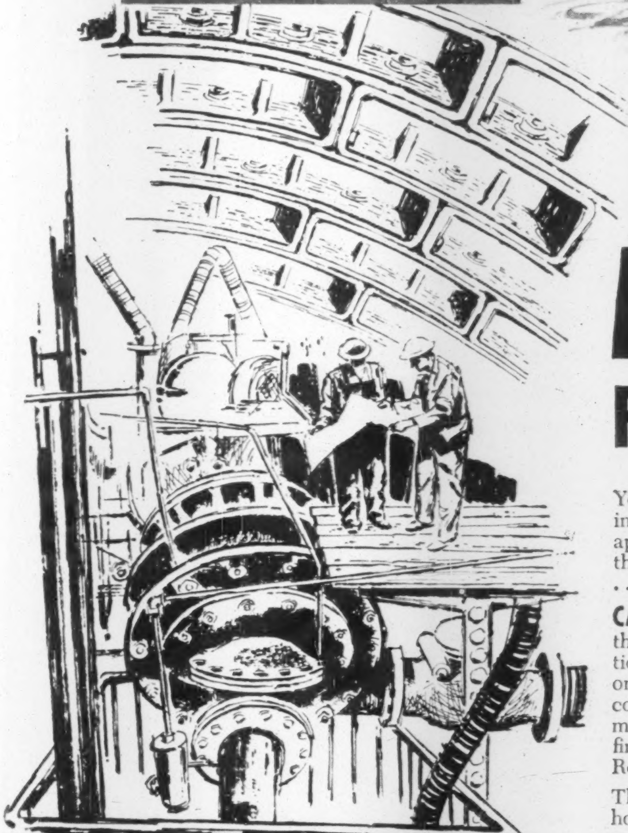
Locating the appropriate probe at least a foot below the surface of—but no more than 100 ft—the material being analyzed will indicate on a portable scaler the amount of moisture or density of the soil being tested. Values shown on the scaler then can be reduced to moisture or density expressions by means of calibration charts.

It is possible to measure density of organic or inorganic materials—while moisture content tests can be made on all inorganic materials and some organic materials as well.

Use of radioisotopes in probes in no way endangers operating personnel, according to the manufacturers. And to take a moisture or density measurement requires no more than two minutes. AMERICAN ELECTRONICS, INC., READE-CURTIS NUCLEAR DIV., 655 W. WASHINGTON BLVD., LOS ANGELES 15, CALIF.



For experience in centrifugal pump applications:



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You use all possible precision in determining your pumping needs. Having done so, you expect an expert, candid appraisal of those needs – and the means of fulfilling them – from a pump manufacturer. Morris provides this . . . and more.

CASE HISTORY: Removal of 8 to 14 feet of silt from the bottom of mile-long Hudson River tunnels has traditionally been done by laborious hand-loading of trucks on temporary rails. A Morris engineer, together with the contractor for the third Lincoln Tunnel, worked out a method of converting silt to slurry with high-pressure fire hoses, and removing with two Morris Dredge Pumps.* Removal time was cut from *20 weeks to 20 days!*

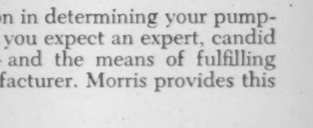
This is only one instance where Morris application know-how has saved customers many thousands of dollars.

In back of that know-how is the Morris know-*why* of modern hydraulic design . . . and nearly a century-long practice of building superb performance and durability into each and every Morris Pump.

Add to this the most complete slurry laboratory maintained by a pump manufacturer for the *anticipation* of critical velocities, pressures, etc., involved in your pumping problem . . . and you may wish to join the pump users all over the continent who come to Morris for help in pump applications engineering.

● On-the-spot sketch shows suction end of dredge pump, protected by grizzly (debris rack), removing silt from third tube of Lincoln Tunnel. Illustrated reprints of article covering this operation are available on request.

*Two Morris 10 GA 28½" Pumps (right) were used . . . one as a dredge . . . the other as a booster.



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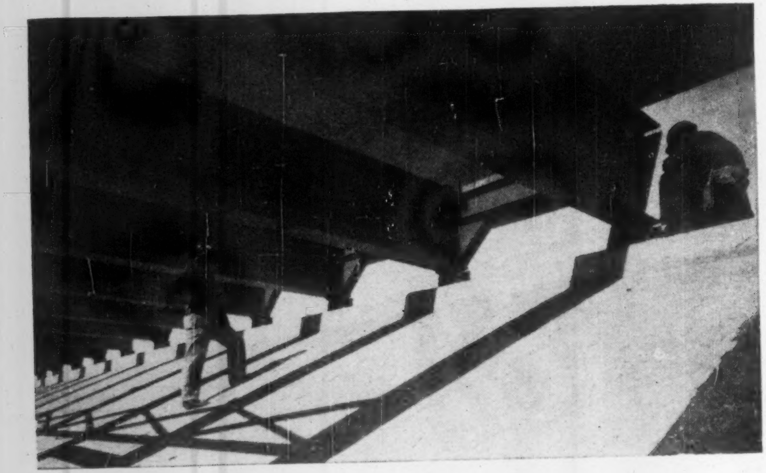

you can count on USS Structural Steel

When you want to erect a bridge in a hurry, it pays to use a familiar, easy-to-work-with material. Can you think of anything that fills the bill as well as *steel?*

For decades, bridge-builders have preferred steel because it's so easy to punch, shear, hot-work, weld, flame-cut, rivet or bolt—and because it can be shop-fabricated and erected in practically any kind of weather. And today, the new High Strength and Alloy Steels allow weight-saving, labor-saving designs that have revolutionized the bridgebuilding art.

And here's the best news: Long before the Interstate Highways Program was suggested, the steel industry was planning new facilities to produce more structural shapes and plates. Some of these new facilities are already in production, and others will follow quickly. They assure you an adequate supply of structural steel whenever and wherever you may need it.

For proven dependability, for simplicity of design, for easy erection, for *availability—you can count on steel.*

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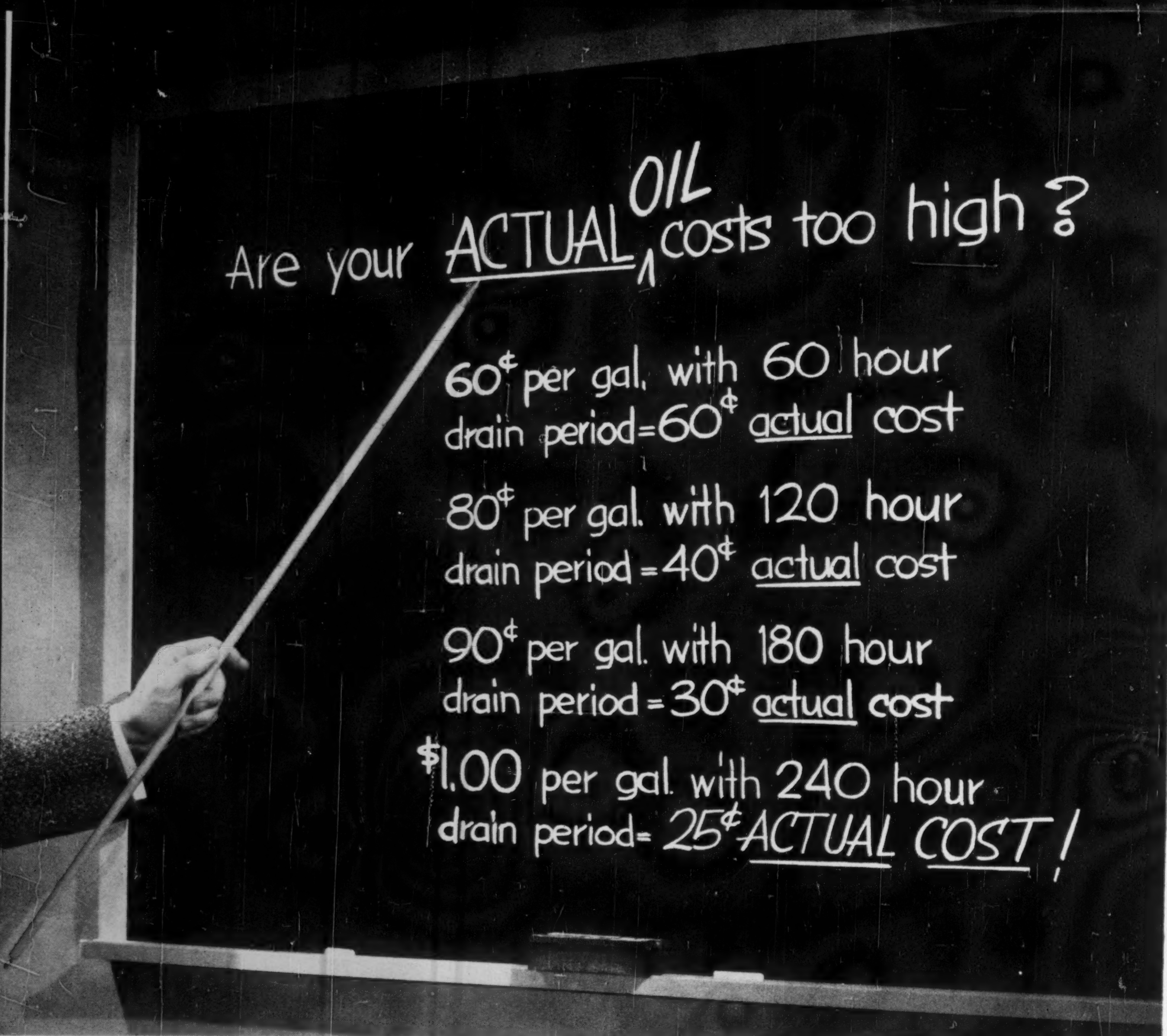
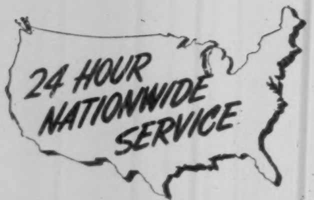

Are your ACTUAL OIL costs too high?
60¢ per gal. with 60 hour drain period = 60¢ actual cost
80¢ per gal. with 120 hour drain period = 40¢ actual cost
90¢ per gal. with 180 hour drain period = 30¢ actual cost
$1.00 per gal. with 240 hour drain period = 25¢ ACTUAL COST!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Publications

The Best In Product Literature

Awards for the year's most outstanding building-product literature and space advertising directed to architects will be presented to Kawneer Co., Perlite Institute, Armstrong Cork Co., U. S. Steel Corp., Fenestra, Inc., and Aluminum Co. of America.

The yearly literature and advertising evaluation is co-sponsored by the American Institute of Architects and the Producers' Council, Inc., an organization of building products manufacturers and associations. The competition provides manufacturers and associations with a standard for appraising their own technical and promotional literature and space advertising. Judging is done by a jury of nationally prominent architects. A record 297 entries were received this year.

Certificates of exceptional merit will be awarded for the following types of literature:

Class 1, literature concerned primarily with basic technical information: Kawneer Reference Book, Kawneer Co., and Perlite Design Manual, Perlite Institute.

Class 2, literature offering technical information confined to particular products of a single manufacturer: Armstrong Floors—Technical Data, Armstrong Cork Co.

Class 3, for literature of primarily promotional character: Walls of Steel, U. S. Steel Corp.

Class 3, for space advertising directed primarily to the architect: Curtain Walls of Steel or Aluminum, Fenestra, Inc., and Aluminum Curtain Walls, Aluminum Co. of America.

For the first time the jury approved a special citation for an original method of bringing the name and products of an organization to the attention of architects. This award will be presented to the Structural Clay Products Institute and its affiliates, the Facing Tile Institute and Architectural Terra Cotta Institute, for their recording of the AIA centennial concert given May 16, 1957. At this concert Conductor Howard Mitchell of the National Symphony Orchestra discussed and illustrated the parallel development of music and architecture.

In addition to the certificates of exceptional merit, 28 certificates of merit and 21 honorable mentions were voted.

Presentation of awards will take place July 7 in Cleveland, during the AIA's 90th annual convention.

Briefs

Asphalt plants—Description of the continuous-mix asphalt plants in the Model 848-A series. Photographs included. 24 page catalogue No. 848-A. Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill.

Track rollers—Make-up and maintenance of track rollers with each roller part reviewed in detail with drawings and photographs. 8 page booklet titled "Don't Buy in the Dark," Form No. D817. Caterpillar Tractor Co., Advertising Div., Peoria, Ill.

Columns—The Lally Column Handbook, 1958 edition now is available. It includes structural design information and complete details for all column sizes and types available. Lally Column Co., 211 Lombardy St., Brooklyn 22, N. Y.

Tractor-scrapers—Job reports discussing production and costs for Cat DW15 No. 428's. 12 page booklet titled "Moments of Decision" (Form D829). Caterpillar Tractor Co., Peoria, Ill.

Conveyors — Types, parts, equipment, defined in "Conveyor Terms and Definitions, Book No. 101" Product, safety and sanitation standards listed. Includes in its 96 pages revised safety code of ASME B20.1-1957. $2. Conveyor Equipment Manufacturers Association, One Thomas Circle, Washington 5, D. C.

Concrete floor patching—Use of Emeri-Quikpatch, plastic and aggregate method. 2 page Bulletin EQ-1. Walter Maguire Co., Inc., 60 E. 42 St., New York 17, N. Y.

Computer service—Digital computer service firm's program for highway earthwork computation is described and other available computer programs are listed. Allstates Design & Development Co., 25 N. Warren St., Trenton, N. J.

Rubber products—Types of hose and conveyor belting along with the product's application, construction and size. 8 page catalogue titled "Rubber Prod-

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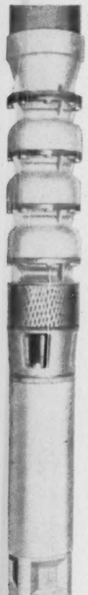

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Completely noiseless.
Space-saving.

Johnston pumps: 4 to 30 inches; 1½ to 1000 hp.; 25 to 10,000 gpm.

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ucts for Every Construction Job." Hamilton Rubber Manufacturing Corp., Adv. Dept., Trenton 3, N. J.

Tractor shovels—Design, engineering, construction and operating features of the HD-6G tractor shovel. 8 page catalogue MS-1234. Allis-Chalmers Manufacturing Co., Tractor Group, Milwaukee, Wis.

Dredges—Photographs, profile, line-drawings and text material detail six basic types of dredges. 12 page illustrated bulletin No. 935. Ellicott Machine Corp., Baltimore, Md.

Fork lift trucks—Engineering, design, construction and operating story of the FP series of lift trucks. 16-page catalog. Engine-Material Handling Div., Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

Lime stabilization—Color movie showing road construction methods by use of lime stabilizers. 23 minute, 16 mm film. National Lime Association, 925 15th St., N.W., Washington 5, D. C.

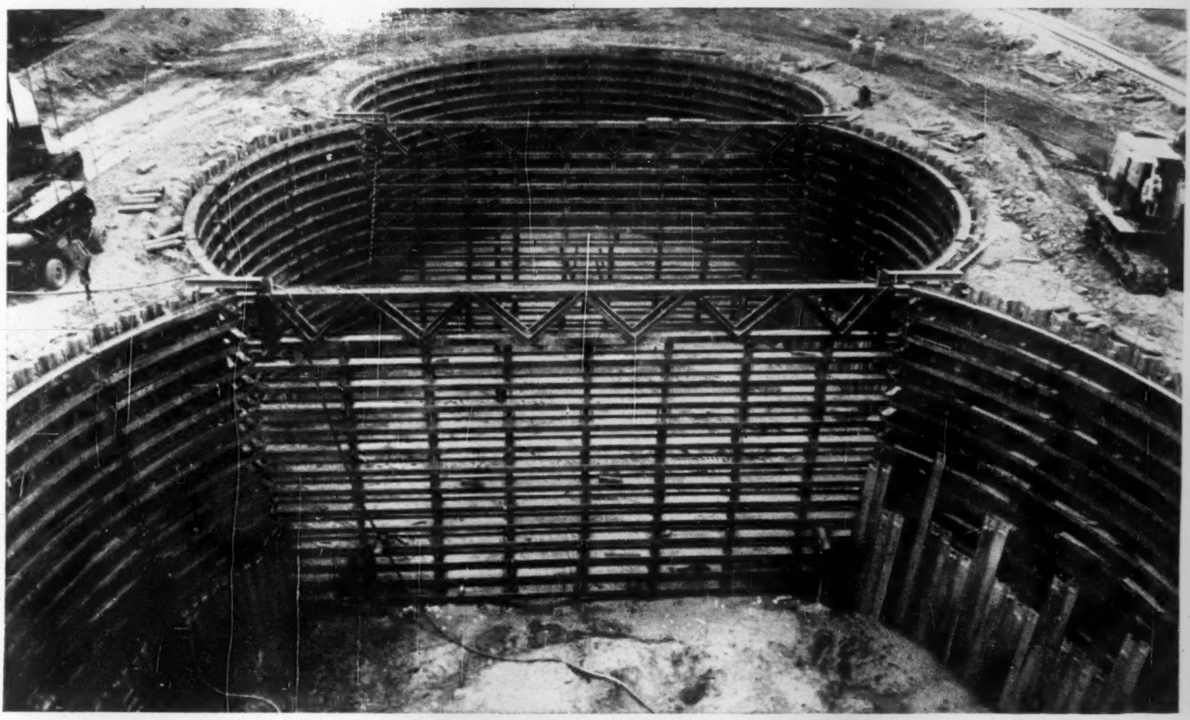
Hydraulic cranes—Working ranges and capacities and specifications of available attachments. Catalogues AD-2407 and AD-2422. Austin-Western, Baldwin-Lima-Hamilton Corp., Aurora, Ill.

Traffic signs—Bid specifications, installation procedures and general information on aluminum increment sheet signs. 16 page booklet, Brochure 58R. Traffic and Street Sign Co., 84 Foundry St., Newark 5, N. J.

Fork truck—4,000 lb capacity, electric powered fork truck, designed to provide maximum economy and available in two standard models. 4 page folder. El-Well-Parker Electric Co., 4205 St. Claire Ave., Cleveland 3, Ohio.

Magnetic torque drive—Description of the "Whitney-Tormag Magnet Drive," with principles of operation, 8 page bulletin. Sidney Chain Co., Hartford, Conn.

Aluminum air ducts—A comprehensive 130 page book contains more than 350 illustrations and data on aluminum air ducts. "Reynolds Aluminum Air Duct Guide" offers detailed chapters on engineering, drafting, estimating, fabricating and installing aluminum ductwork for residential, commercial and industral applications. It also presents latest findings on the control of duct noises. Reynolds Metal Co., P. O. Box 1800-A, Louisville, Ky.



New way to get open pit advantages

The world's largest pit ever to use the curved-wall shaft construction technique was excavated on the bank of the Ohio River for Public Service Company of Indiana, Inc.

The Gust K. Newberg Construction Company contracted the foundation excavating job for new condenser and turbine installations. Required: A pit 210 feet long, 96 feet wide, and 60 feet deep.

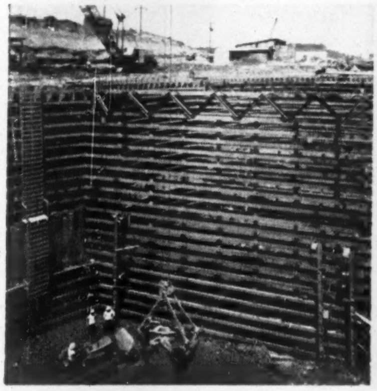
COMMERCIAL engineers suggested three intersecting circular shafts to eliminate conventional lacework of horizontal and vertical cross bracing and thus keep the excavation open. The circle also made a better seal against 600 gpm seepage in the bottom third of the pit which was below the level of the adjacent river.

An engineering innovation is the steel strut bracing in two separate walls at the junctions of three overlapping circles. These form the only wall-to-wall braces in the entire excavation. These were required for equal distribution of the external forces on the sheet steel piling backed up by curved walers or ribs.

A patented progressive bending method was used by COMMERCIAL to form the 12" W.F. @ 50#/ft. rib segments to the exact design curvature without buckling the web. As excavation progressed, these segments were bolted together to form complete horizontal rings spaced on 2½-ft. centers.

The resulting speed of excavation and ease of pouring the foundation should offset through labor savings the extra initial cost of steel ring walers and bracing struts. Added savings will result by salvaging most of the supports for future use after completion of the foundation.

Complete engineering assistance is available to help you with your next open pit or tunnel project, large or small. There's no obligation. COMMERCIAL'S more than 25 years of experience in the design and fabrication of supports for soft ground and rock excavation may be able to provide the cost-cutting answers you need. Address inquiries to Commercial Shearing & Stamping Company, Dept. E-25, Youngstown, Ohio.



TIME SAVINGS and cost advantages over the conventional lacework method are apparent as bulldozers and other equipment work in unobstructed area to remove more than a million cubic feet of earth.

"A DEFINITE SUCCESS", say Charles Brooks, Project Engineer (left) and O. W. Simmon, Gust K. Newberg Superintendent. "The labor and time saved by the ring walers indicate our investment will pay off."

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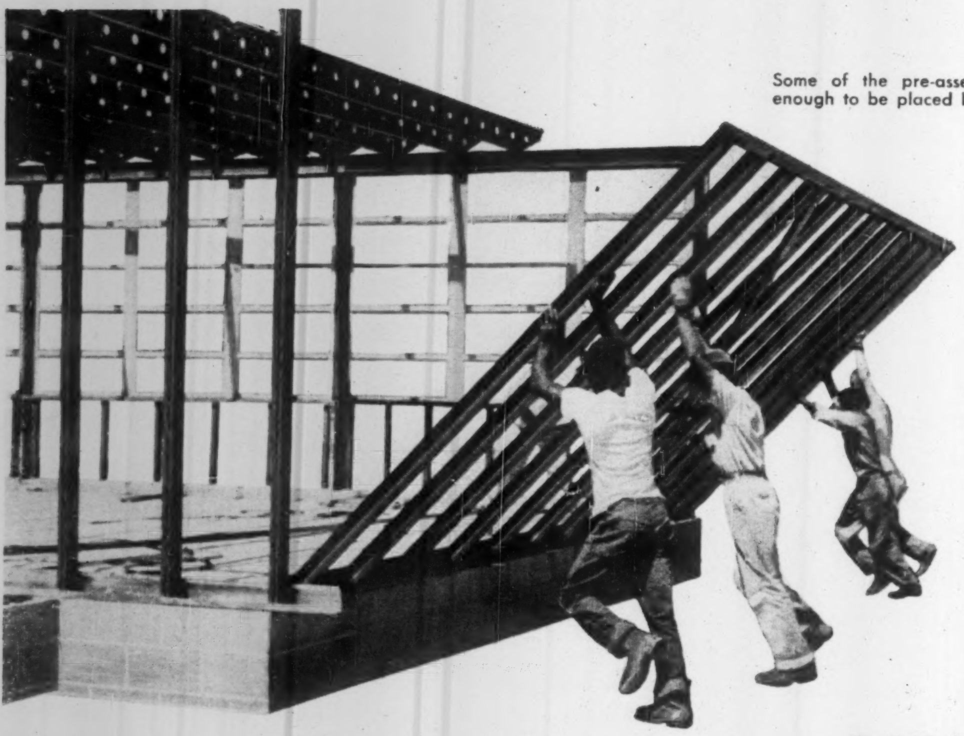


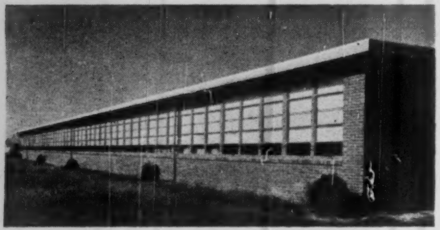
Some of the pre-assembled panels were light enough to be placed by 3 or 4 men.

Framed with LIGHTSTEEL

Virginia Schools go up in record time

ABOVE: LIGHTSTEEL nailing feature speeded metal lath attachment.

BELOW: Camellia Elementary School, Princess Anne County, Va.



Facilities including eight to twenty-eight classrooms *completed in one-half normal time* — that's the speed record set in Virginia during the erection of eleven modern schools.

All were built to high standards, using Penmetal LIGHTSTEEL structural sections, metal lath and plaster. The LIGHTSTEEL was assembled into wall panels and welded at the plant of J. K. Parker, Inc., London Bridge, Virginia, then trucked to the job site and quickly placed. Mr. Parker says, "The steel framework for an 8-classroom building can be completely erected and the building 'closed in' in about 15 days."

A number of factors account for the low cost, high-speed erection of the schools. LIGHTSTEEL is inexpensive, light in weight, has a nailing feature. What's more, ease of fabrication enabled J. K. Parker and architect A. Ray Pentecost, Jr., to develop the pre-assembly system which contributed many time-saving features.

Send for further details of these schools. Also ask for a copy of catalog SS-22.

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Right to Sublet

May be restricted in amount or in manner

A provision in a general contract limiting the amount or restricting the manner in which the work can be subcontracted is valid and enforceable.

The rule was applied against a highway contractor, who claimed unsuccessfully that withholding of permission to sublet was a breach of contract, in the following case.

Lenart Constructors, Inc., entered into a contract with the State of New York for part of the work in construction of the Brooklyn-Queens Expressway. The contract contained the following provisions:

"The contractor shall perform with his own organization work amounting to not less than 50% of the remainder obtained by subtracting from the total original contract value the sum of any items designated in the contract as 'Specialty Items.'

"Any items that have been selected as 'Specialty Items' for the contract are listed as such in the Special Provisions found elsewhere in the contract.

"No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer or his authorized representative.

"Request for permission to sublet, assign, or otherwise dispose of any portion of the contract shall be in writing and accompanied by a showing that the organization which will perform the work is particularly experienced and equipped for such work. Consent to sublet, assign or otherwise dispose of any portion of the contract shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract."

The contractor made an application to sublet part of the work. Up to the time this application had been made, the authorities had granted the contractor the right to subcontract 77 items to 18 different subcontractors, the total value of the work so subcontracted amounting to $1,707,000. Owing to the large percentage of the original contract that had been sublet, the authorities refused to consent to subletting any more of the work. After the work was completed, the contractor brought an action against the state to recover damages it claimed as a result of the state refusing to permit it to subcontract the other items of work.

The action was dismissed, the court stating: "The dispute which has arisen here is limited to the right of the claimant to delegate the performance of a contractual duty by subcontracting for a portion of the work with another contractor. At the time of entering into this contract the claimant had no right to delegate performance of the contract or any part thereof. He could acquire such right only by the express consent of the Superintendent of Public Works and the contract clearly provided that this consent would not be granted for more than 50% of the total original contract value. This prohibition against the delegation of performance is a valid provision of the contract. 2 Williston on Contracts (Rev. Ed.) 1217. Restatement of the Law of Contracts, Sec. 160. It does not involve any question of an invalid restraint upon the right of alienation and it was not repugnant to public policy since the contractual provisions were a reflection of statutes and federal regulations. Unless there was some implied obligation on the part of the Superintendent of Public Works to consent to a delegation of the duty of performance in whole or in part, a refusal to so consent could not constitute a breach of contract by the state. Such refusal could not be either a failure to perform an act promised or a prevention or hindrance of the performance which the claimant had agreed to deliver. Thus there could be no breach by the state. Restatement of Law of Contracts, Sec 312."

(1) Lenart Constructors, Inc. v. State of New York, 165 N.Y.S. 2d 407, Court of Claims, New York, June 24, 1957.

Construction Work May Be Done at Owner's Risk

Under Kansas law, a contractor is not liable for a failure if the risk has been assumed by the owner.

Here is an example.

The owners of an oil well brought an action against a cementing company to recover damages resulting from the destruction of the well due to the way cement operations were done. The contractor disclaimed any responsibility since the contract contained a provision to the effect that the cementing work was to be done at the sole risk of the owners of the oil well. The court sustained the contractor's contention and the judgment in favor of the contractor was affirmed on appeal.[1]

"We agree," said the appellate court, "with the District Court that the provision of the contract relieving the defendant (contractor) of liability for loss or injury to the well was valid and effective both under the law of Kansas and the law generally applicable."

(1) Associated Resources Corp. v. Halliburton Oil Well Cementing Co., 238 F. 2d 957.

Refusal to Complete Job Justified by Nonpayment

Failure to pay an installment due on a building contract is generally such a material breach as to excuse further performance by the builder.

The rule was applied this year in a Maryland case, where a contractor had agreed to construct storm sewers in a development.

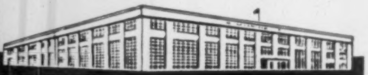
The work was laid out in two sections. After completing substantially all the work called for by the first section, the contractor declined to perform the work called for by the second section, on the ground that the owner had failed to pay for the work performed in the first section and on the further ground that the owner failed to obtain the permits necessary to perform the second section.

The contractor brought an action to recover the balance due for the performance of the first section and for damages for breach of contract.

The owner contended that it was justified in refusing payment until all the work was fully completed, since the contract was entire and indivisible, and that the contractor committed an anticipatory breach of the contract by indicating its intention not to proceed with the second section of the work.

The trial court found that the contractor had substantially performed the work on section one and the failure to pay the contractor for this part of the work constituted a breach of contract. The contractor was granted a judgment which was affirmed on appeal.[1]

The appellate court stated: "Failure to pay an installment due on a building contract is generally held to be such a material breach as to excuse further performance by the builder. Guerini Stone Co. v. P. J. Carlin Const. Co., 248 U.S. 334, 344, 39 S. Ct. 102, 63 L.Ed. 275; 3 Corbin, Contracts, Section 692; 3 Williston, Contracts, (Rev. Ed.) section 866. This may be true even if the contract were divisible. See 3 Williston, Contracts (Rev. Ed.) Section 887D. Among other remedies that a builder may pursue is the remedy of a suit for damages for a total breach, which would ordinarily be the unpaid contract price less the reasonable cost



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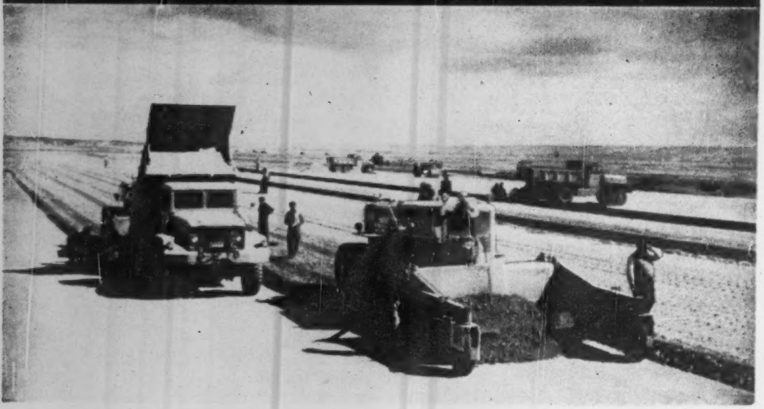

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of completion of the work unperformed. Hammaker v. Schleigh, 157 Md. 652, 668, 670, 147 A. 790, 65 A.L.R. 1285; Bush v. Baltimore & C. Construction Co., 88 Md. 665, 668, 41 A. 1092; 3 Corbin, Contracts, Section 693; 3 Williston, Contracts, (Rev. Ed.) sections 805, 842."

(1) Shapiro Engineering Corp. v. Francis O. Day Co., 137 A. 2d 695, Court of Appeals of Maryland, Jan. 22, 1958.

Government Contracts And Brokerage Fees

Under a statute providing that on certain government contracts no person or agency may be employed to solicit contracts on a contingency fee basis, except bona fide employees or established commercial or selling agencies, a violation of the law relieves the contractor from liability to pay commissions.

A case that may be a valuable source of information on this phase of law is one handed down by the U.S. District Court in West Virginia.[1]

Case involved the award of a prime contract for parts used by the Atomic Energy Commission. A central figure in the negotiations was an individual who worked for one of the companies that had a financial interest in the prime contractor.

The individual asserted a right to a brokerage fee and sued for a commission even though the prime contract specifically stated that no fee or other commission was being paid for the contract.

The court ruled that there was no implied agreement to pay a fee and no legal obligation to do so. Action was dismissed.

(1) Weitzel v. Brown-Neil Corporation, 152 F. Supp. 540, U.S. District Court of West Virginia, June 19, 1957.

Court Lets Jury Decide Engineering Fee Issue

In the absence of a written agreement, the question of whether an arrangement for the rendering of engineering services contemplates payment of a 10% is a fact for a jury to decide.

A situation of this kind is outlined in the case below.

The Western Machinery Company is engaged in the business of rendering engineering services and constructing mills for concentrating minerals. Consolidated Uranium Mines requested Western to do some preliminary engineering work on a tungsten mill that

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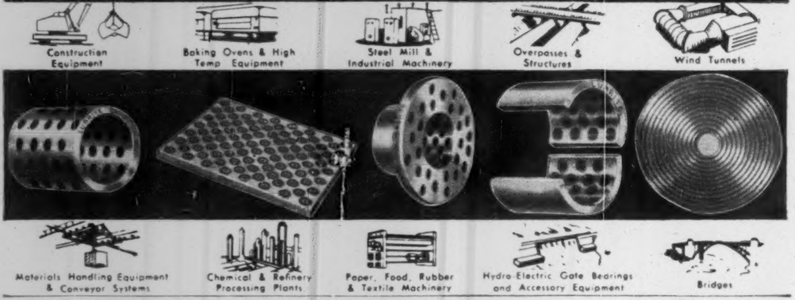
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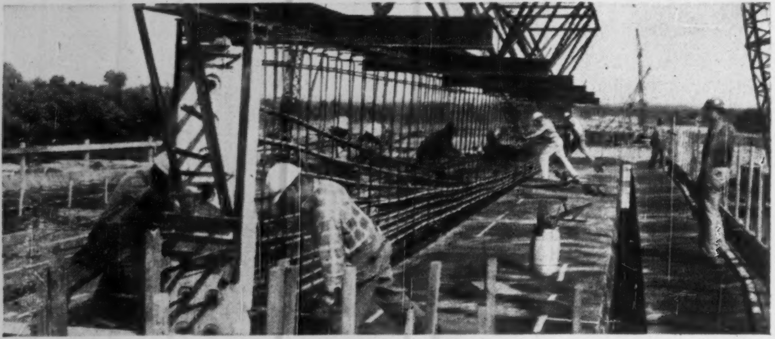

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it was about to build at Austin, Nevada.

The engineering firm was paid for the preliminary engineering services rendered. Thereafter, Consolidated commenced construction of the mill. After the work had started, a representative of Consolidated telephoned Western and asked if it would undertake completion of the mill. Western wrote Consolidated that it would undertake completion of the mill and that Consolidated should pay for all labor and material and that most of the work would be subcontracted to Western Knapp Engineering Company.

Western worked on the project for several months and then Consolidated terminated the arrangement and undertook to complete the project. Western brought an action against Consolidated to recover the sum of $23,008.47, representing out of pocket expenses of $13,173.11, to cover overhead, rent and other expenses and $9,835.36 claimed as a 10% engineering fee.

Western claimed it had inadvertently omitted the 10% engineering fee in its letter setting forth the terms under which it would perform the work.

The jury brought in a verdict in favor of Western in the amount of $9,000 from which it appealed, but the judgment was affirmed on appeal, the appellate court holding that since there was no written agreement to pay the 10% engineering fee, whether or not there was such an agreement was a matter of fact to be determined by the jury.

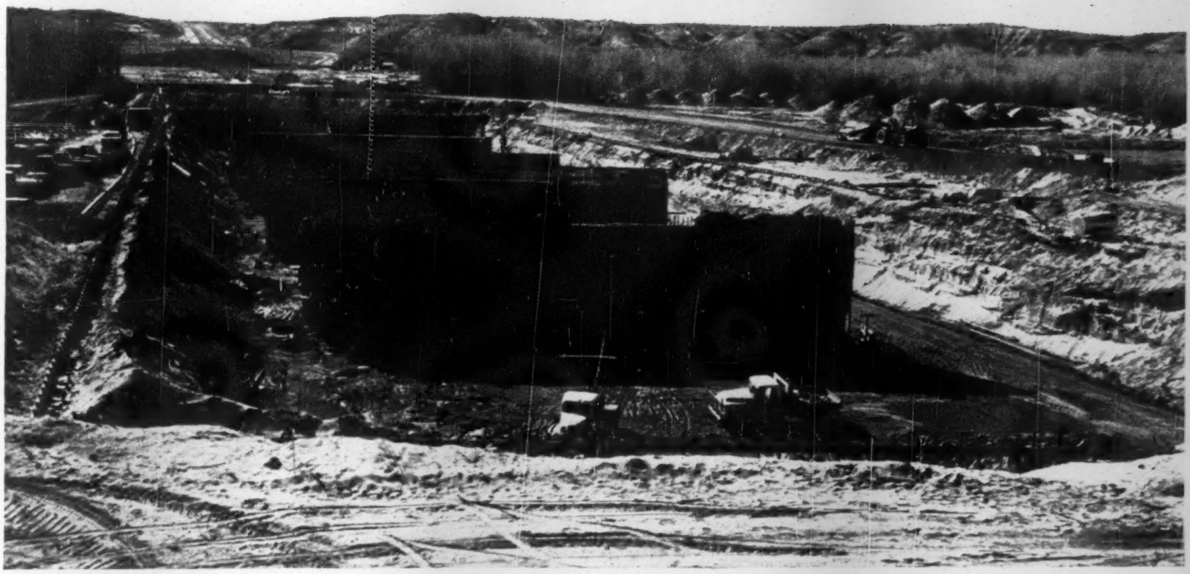
(1) Western Machinery Co. v. Consolidated Uranium Mines, Inc., 247 F. 2d 685. U. S. Court of Appeals, Tenth Circuit. August 7, 1957.

Sub Has To Pay Supplier Before His General Pays

One who supplies material to a subcontractor may be entitled to recover the purchase price before the sub is paid by the general contractor.

In a Connecticut case decided earlier this year, nonpayment by the general contractor was ruled out as a defense by a subcontractor who had been sued for the price of materials he had used on a job. The facts were these:

On September 28, 1951, E. Van Noorden Company (plaintiff) received an order from The Hartford Roofing & Sheet Metal Company (defendant), for fabrication of 46 skylights. The defendant was employed as a subcontractor on a housing project. The understanding was that payments would be



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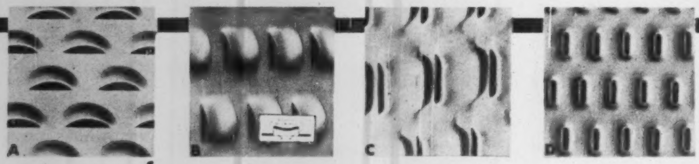

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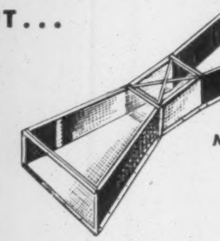
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made as requisitioned by the plaintiff. The skylights were fabricated in accordance with plans and specifications and were approved by the architects of the project and were delivered to the defendant-subcontractor. In spite of the fact that plaintiff made many demands for payment and the subcontractor promised to pay for the skylights, no payment was made. The plaintiff then brought an action to recover the balance due him under the contract and obtained a judgment.[1]

The subcontractor contended that it was under no obligation to pay plaintiff until it had been paid by the general contractor for the skylights. The contract contained no such provision. As to this claim, the court stated: "It was not required, as contended by the defendant, to wait until the latter had received full payment from the general contractor. Alvord v. Cook, 174 Mass. 120, 124, 54 N.E. 499; Rosenthal v. Schwartz, 214 Mass. 371, 373, 101 N.E. 1070; Canton v. Thomas, 264 Mass. 457, 162 N.E. 769."

(1) E. Van Noorden Company v. The Hartford Roofing & Sheet Metal Co., 147 N.E. 2d 749, Supreme Judicial Court of Mass., Feb. 5, 1958.

Liability for Dumping On Another's Property

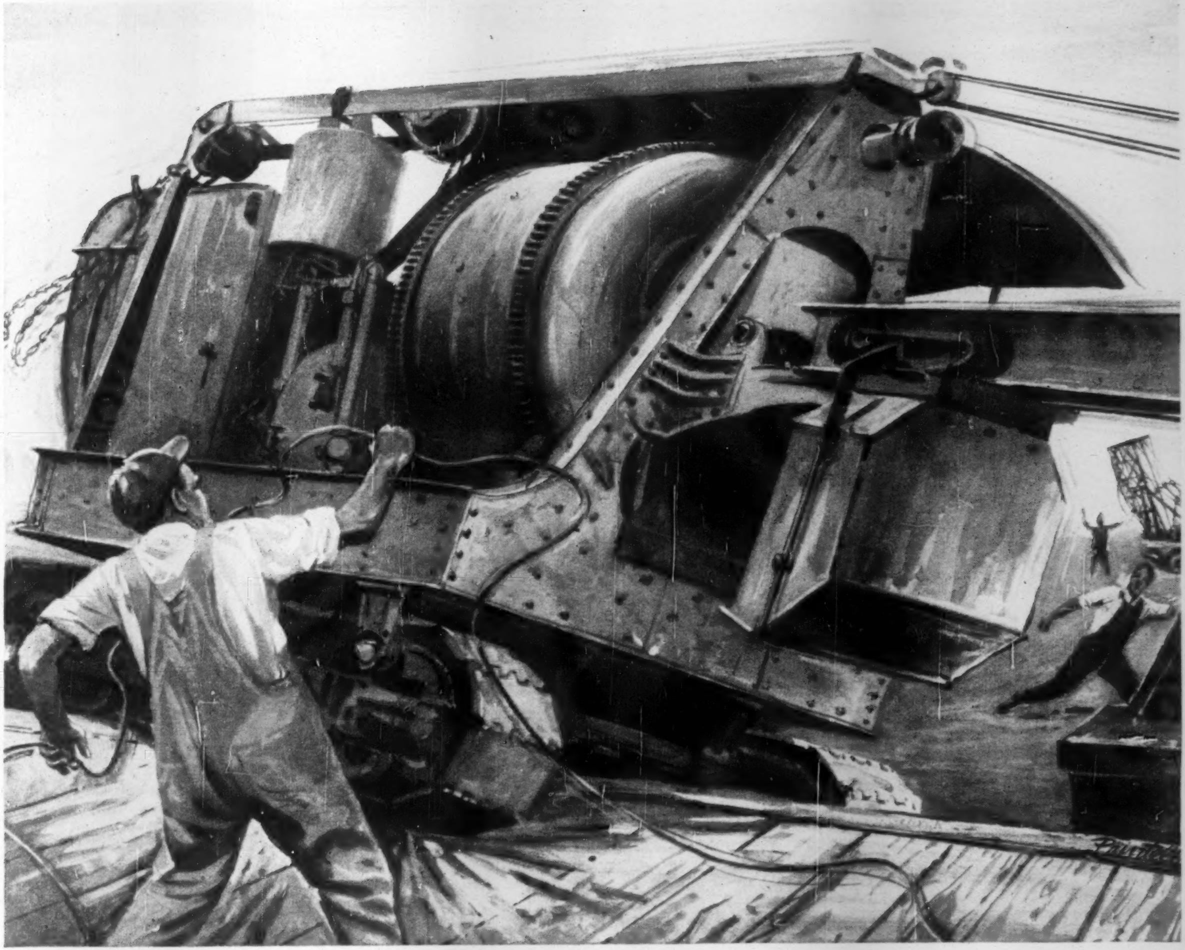
One who unlawfully dumps debris on another's land is liable for the costs of restoration.

A contractor engaged in laying mains for a municipality, dumped the material excavated on a vacant lot not owned by the municipality. The owner of the lot brought an action against the contractor to recover damages. The property owner obtained a judgment which was affirmed on appeal.[1]

The appellate court held that the only issue involved in the litigation was the measure of damages that the owner of the lot was entitled to recover, and that this was what it would cost to have the premises restored to the condition it was in before the contractor committed the wrongful acts.

(1) Strauss v. McCurdy, 143 N.E. 2d 620.

These summaries of court decisions are prepared by I. Vernon Werbin, Esq., New York attorney and licensed professional engineer, who is author of the following books published by McGraw-Hill Book Company, Inc.: *Legal Phases of Construction Contracts; Legal Guide for Contractors, Architects and Engineers; and Legal Cases for Contractors, Architects and Engineers.*



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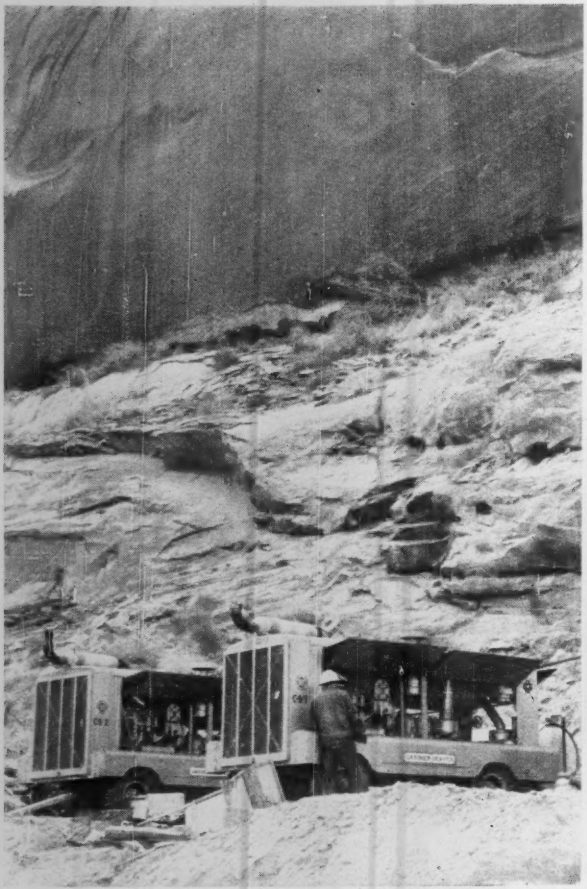

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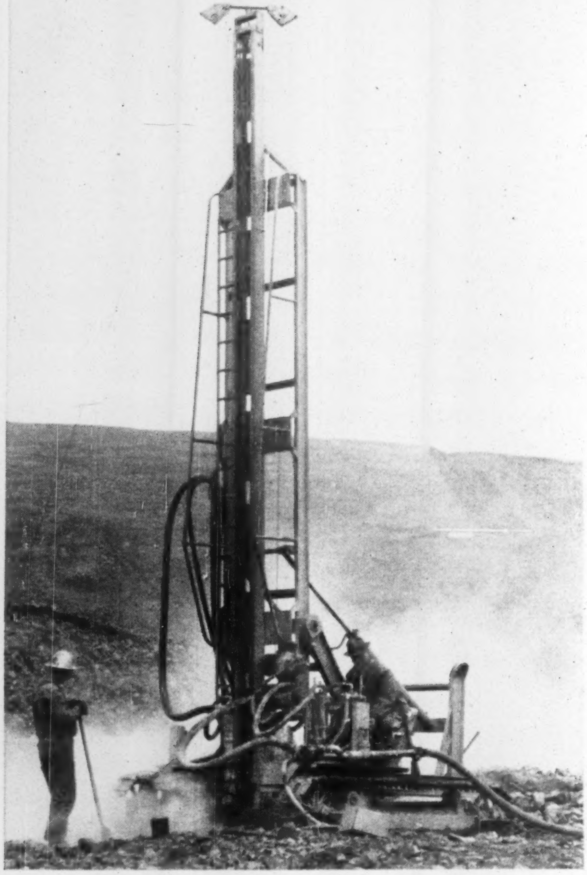

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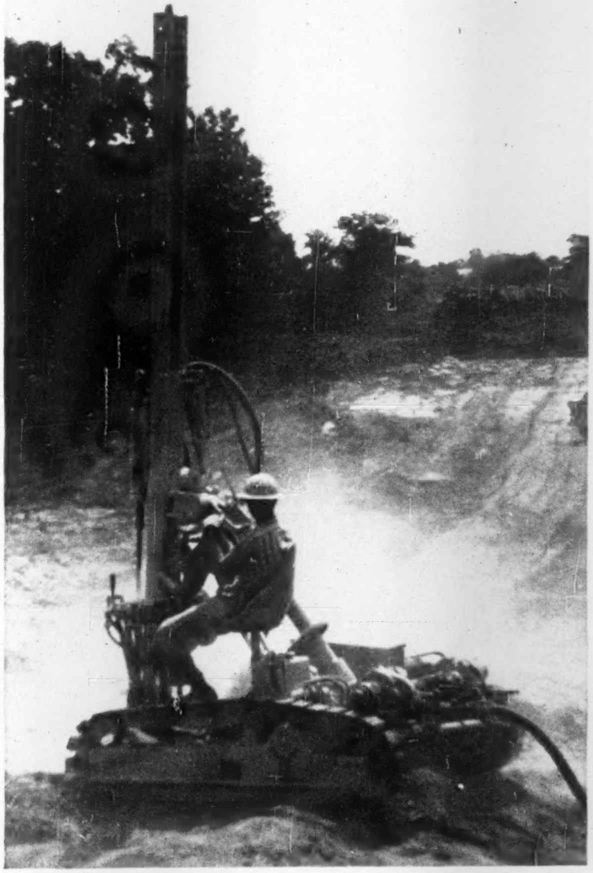
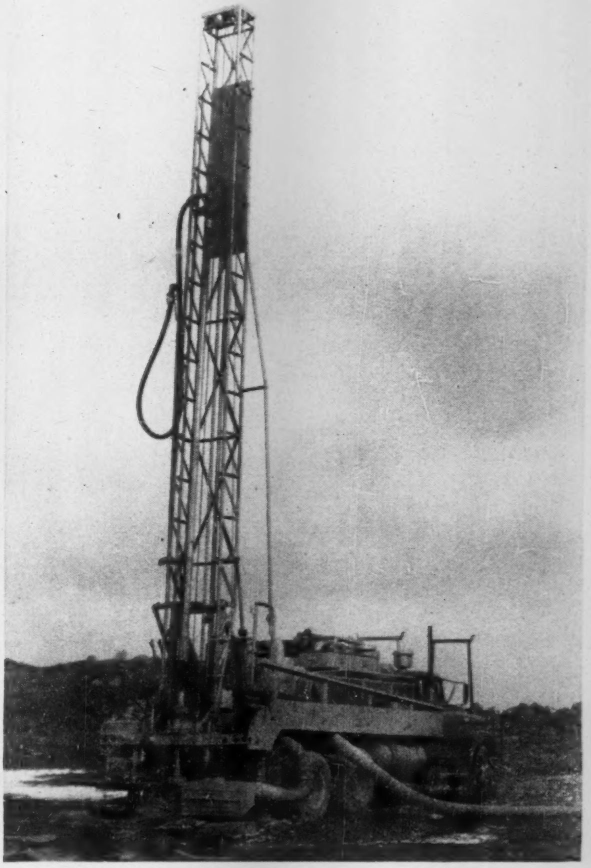


This deluxe model "Air Trac"® provides complete power positioning for all vertical, horizontal and flat lifter holes.



Drill big bore hole in a hurry with the Gardner-Denver "Mole-Dril"*. It follows the bit down the hole, delivers more foot-pounds of energy to the bit than any other drill of its size.

*T.M.

that's why heavy-rock contractors go GARDNER-DENVER

When it comes to moving mountains of rock, contractors rely on Gardner-Denver. These men know how Gardner-Denver equipment performs on the rough jobs. They know it's built to last longer . . . stands the gaff with minimum maintenance . . . gets the job finished faster at lowest cost. Drop in and see your nearest Gardner-Denver distributor soon.

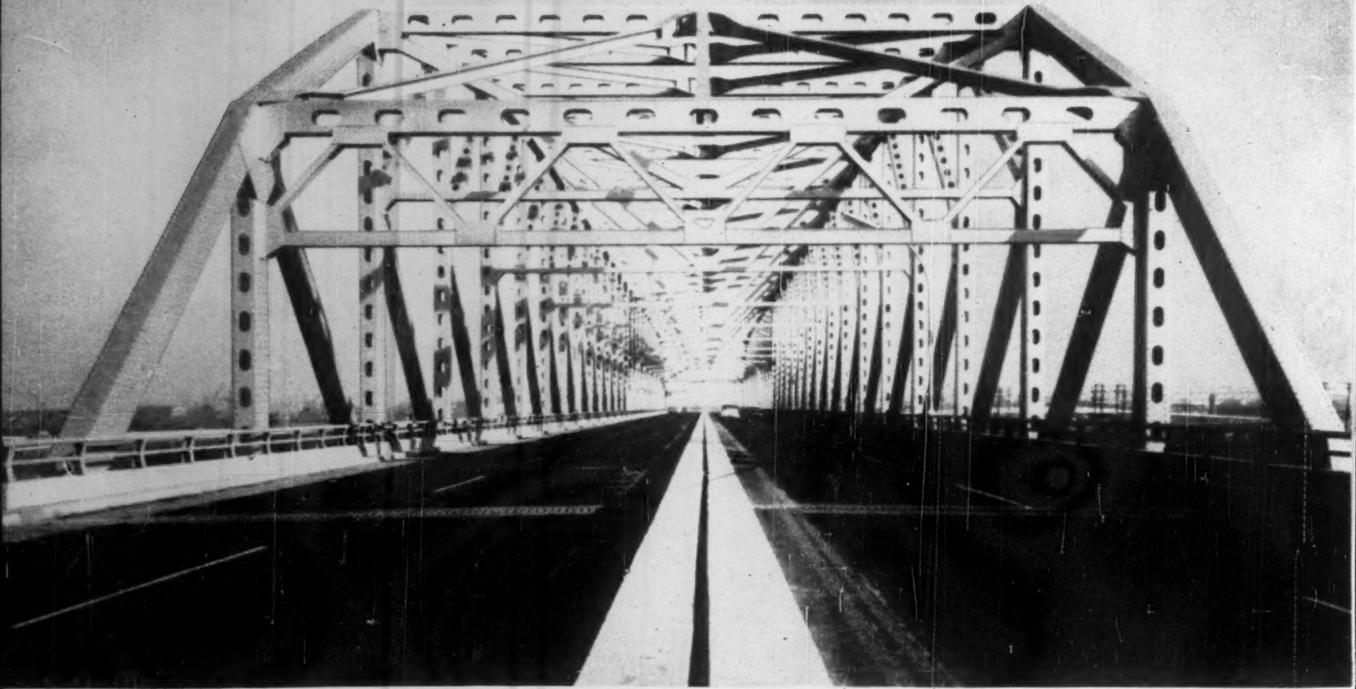
GARDNER-DENVER Since 1859

KELLER TOOLS

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario



World's longest K-truss bridge part of Baltimore's Patapsco Tunnel Project

Comprised of two spans 516′ and 451′ long, this 967′ continuous through K-truss bridge that crosses existing railroad tracks and a future railroad yard is the longest ever built. American Bridge fabricated and erected 3,772 tons of structural steel in the construction of this bridge, including 463 tons of USS COR-TEN* High Strength Steel in truss members. This contract also included 20 beam approach spans ranging from 27′ to 105′ in length, and requiring 1,486 tons of structural steel. This, too, was fabricated and erected by American Bridge.

Unusual length is not the only feature of this bridge. Approximately 875 tons of dead weight was eliminated by using 4¼″ concrete-filled I-Beam-Lok* for the floor. 128,968 sq. ft. of this lightweight flooring was used, not only to save weight, but to simplify and speed up floor installation.

For this important new Patapsco highway artery, American Bridge furnished a total of 9,840 tons of structural steel and 4,624 tons of weight-saving, time-saving I-Beam-Lok bridge flooring.

American Bridge has specialized in steel fabrication and erection for over 50 years. It can handle *any* structural job quickly and expertly, anywhere. Let our specialists help you. Get in touch with our office nearest you.

Remember—Steel saves time . . . Steel saves money . . . and Steel stays!

Details of design: 2-span, continuous through K-truss bridge. 967′ (451′ and 516′). Center pier on skew. Trusses, 68′ apart, center-to-center . . . each have 30 panels, 32′ 3″, with built-up truss members and struts. 3,772 tons of structural steel (including 463 tons of corrosion-resistant USS COR-TEN High Strength Steel). Beam approach span, east end, is 69′ 8″ long. Seven beam approach spans, west end, range from 51′ to 105′. All erected by American Bridge.

Owner: Maryland State Roads Commission

Consulting Engineer for Project: J. E. Greiner Company, Baltimore, Md.

Contracting Engineer: (Design and Field Supervisor): Witman, Requardt & Associates, Baltimore, Md.

General Contractor: C. J. Langenfelder & Son, Inc. Baltimore, Md.

American Bridge
Division of USS **United States Steel**

*TRADEMARK

General Offices: 525 William Penn Place, Pittsburgh, Pa. Contracting Offices in: Ambridge · Atlanta · Baltimore · Birmingham
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Orange, Texas · Philadelphia · Pittsburgh · Portland, Ore. · Roanoke · St. Louis · San Francisco · Trenton · United States Steel Export Company, New York

Men and Jobs

ROYCE J. TIPTON, Denver engineer.

Scholarship Fund

Denver engineers give $20,000 to fund for non-technical study

To enable engineering students to take a fifth year in liberal arts, two Denver consulting engineers recently brought to $50,000 a scholarship fund they established for that purpose at the University of Colorado. The engineers, R. J. Tipton and Olin Kalmbach of Tipton Associated Engineers, Inc., earlier this year had started the fund with a $30,000 gift.

The scholarship program was termed by Mr. Tipton a "reverse grant-in-aid" from South America in that the contributions to the scholarship fund have been derived largely from consulting earnings over a period of 10 years in South American countries, including Peru, Colombia, Ecuador and Venezuela.

At present, two $1,200 scholarships, each extending over a two-year period, can be supported under the scholarship. The two scholarships will be staggered so that each year one can be awarded to an engineering student interested in taking an additional year of liberal arts courses.

Primary purpose of the program is to produce better-rounded engineers who will be better qualified to serve in administrative as well as technical capacity. "The standard four-year engineering curriculum does not allow enough time for the average student to take many courses in the liberal arts," Mr. Tipton said.

Caterpillar Tractor Co. Names Three New Officers

Executive promotions at Caterpillar Tractor Co., Peoria, Ill., make Gail E. Spain president of the company's Foreign Trade Group, and vice presidents of J. R. Munro and W. K. Cox.

Mr. Spain has been with Caterpillar 28 years. For the last 15 years, he's been vice president in charge of sales and sales promotion. He will administer the company's British, Australian, Brazilian and Canadian subsidiaries, as well as Caterpillar Americas Co., Caterpillar Overseas C. A. and Caterpillar of Delaware, Inc.

Mr. Munro is a 40-year employee of Caterpillar. He will have administrative responsibility for the company's manufacturing division, which will include the General Offices of Manufacturing, Purchasing and Traffic.

Mr. Cox is a 30-year man. He steps into the post vacated by Mr. Spain, assuming administrative responsibility for domestic sales and sales promotion. L. L. Morgan advances from assistant manager to manager of sales promotion.

James Taylor, Jr., Named Vice President of Fuller

George A. Fuller Co., of New York City, has named James B. Taylor, Jr., a vice president.

A native of New York City and a civil engineering graduate of Manhattan College, Mr. Taylor joined the building firm in 1940. He was superintendent of construction on the Naval Air Base at Quonset Point, R. I., and the Argentia Naval Air Base in Newfoundland. More recently he handled construction of new office buildings for Travelers Insurance Co. and Aetna Life Insurance Co. in Hartford, Conn.

(Men and Jobs continued on page 178)

FOUNDATIONS
UNDERPINNING
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CATALOGUE ON REQUEST

10 E. 40th ST., NEW YORK 16,
DETROIT: 2033 PARK AVE.
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WINCO®

PORTABLE ELECTRIC POWER

WITH Automatic CONSERV-er IDLING CONTROL

✓ EXTENDS ENGINE LIFE
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✓ LOWERS MAINTENANCE COST

WINCO MODEL 205B14S2D-1M 2500 watts, direct drive, 115 volts, 60 cycle A. C. Lightweight. Carrying Cradle optional

After starting, plant automatically idles, until load of 75 watts or more is applied. Automatic CONSERV-er brings engine to full power when tool is turned on; reduces engine to idling speed when tool is turned off—all automatically. Get all the facts on this Profit-Building Winco feature.

FULL LINE OF PORTABLE AND STAND-BY AC & DC PLANTS. 300 WATTS TO 10 KW
WRITE DEPT.

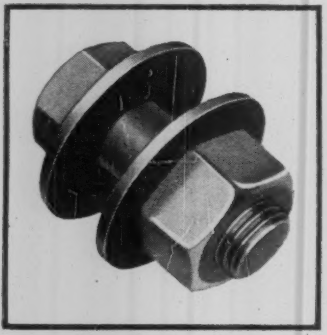
WINCHARGER CORPORATION
SIOUX CITY, IOWA
Subsidiary of Zenith Radio Corporation

A PLAN FOR THE FUTURE
WE HAVE A PART IN TODAY!

PROJECT STATISTICS

Exhibits Section:	**1,600,000 sq. ft.**
4 exhibit areas	100,000 sq. ft.
Storage space	90,000 sq. ft.
Banquet room	3,000 to 5,000 capacity
Arena Section:	**315 ft. dia. x 100 ft. high**
Seating	14,000 capacity
Over-all parking	2,850 spaces
Available floor space	51 acres
Project covers 17 acres of land	

A.S.T.M. A325-55T*
WASHERS
when you need them!



Our ability to produce and deliver hard, flat and concentric washers made of prime stock to exact A.S.T.M. specifications has given us the privilege of taking part in the construction of Detroit's vast new Civic Center project.

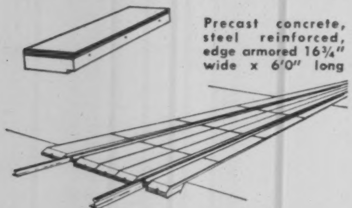
Our reputation as a source for high strength construction washers on a direct basis to contractors and steel fabricators is growing every day. Standard sizes stocked for immediate delivery are: ½″, ⅝″, ¾″, ⅞″, 1″, 1⅛″, and 1¼″. Save time and money, order high strength construction washers direct from the manufacturer.

*Hardness of 68 to 75 Rockwell A, and carburized to a minimum depth of .015″. Quenched and tempered (non-carburized) washers have a hardness of 35 to 45 Rockwell C.

Write today for our newest price list on ASTM washer sizes available for immediate shipment.

WHITEHEAD STAMPING CO.
1662 WEST LAFAYETTE BLVD., DETROIT 16, MICHIGAN
WHITEHEAD

CROSSING SLABS


Precast concrete, steel reinforced, edge armored 16¾″ wide x 6′0″ long

WRITE FOR
Bulletin X-540

For strength, durability, smooth riding qualities with minimum maintenance

PERMACRETE PRODUCTS CORPORATION
1839 South Wall Street, Columbus 7, Ohio

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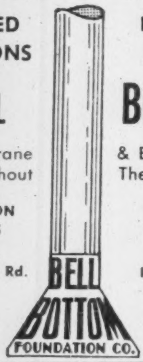


Sol King, president

Top Executive Changes At Albert Kahn Associates

Sol King, former vice president of Albert Kahn Associated Architects and Engineers, Inc., Detroit, has become president of the firm.

George H. Miehls, who had been president since 1945, and chairman since 1956, has relinquished the presidency of the firm to devote his full time to the positions of chairman of the board and treasurer.

A graduate of the college of architecture of the University of Michigan, Mr. King joined the Kahn organization in 1935. In 1948, when membership in the firm was first opened to key employees other than those admitted to partnership as associates by Albert Kahn, the founder, Mr. King was made a member. Seven years later he was elected to the board of directors and was made a vice president of the firm. Shortly thereafter, he was named director of architecture, a post he will continue to hold.

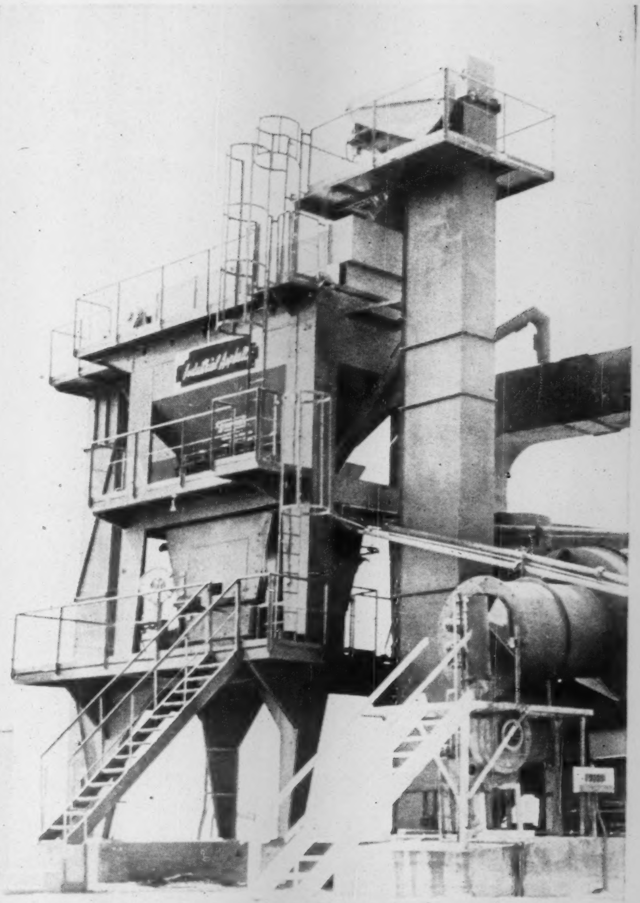
Corps' E. C. Itschner Elected SAME President

Maj. Gen. E. C. Itschner, Chief of U. S. Army Engineers, became president of the Society of American Military Engineers at its 38th annual meeting at Fort Belvoir, Va., in late May. General Itschner, the first Chief of Engineers to hold the presidency since 1927, succeeds Rear Adm. H. Arnold Karo.

The society's George W. Goethals Medal was awarded to Lt. Gen. Raymond A. Wheeler, former Chief of Army Engineers, in recognition of his ingenuity and energetic direction of salvage and clearing operations in the Suez Canal in the winter of 1956-57.

(*Men and Jobs continued on page 180*)

AMERICA'S NUMBER ONE ASPHALT PLANT!



Successful contractors throughout the nation recognize the *STANDARD model R-M* as *AMERICA'S NUMBER ONE ASPHALT PLANT* because of its superior design and quality.

Big — Fast — Rugged — Clean — Economical — describe the STANDARD model R-M Asphalt plant with its king-size capacity — Super-Lift dryer (with saw-tooth lifter) — heavy duty, Hi-Speed mixer — Simplex push-button batching control — positive control of liquid asphalt — over-size elevator and vibrating screen — are some of the *many money making features* assuring higher production with less maintenance for successful contractors — everywhere!

Available in 2000, 3000, 4000, 5000, 6000, 7000 and 8000 pound batch capacities. No matter what your hot mix needs are, there's a STANDARD R-M plant to do the job. Economical, low erection and operating costs provide more profits year in, year out.

STANDARD

Model R-M

ASPHALT PLANTS

STANDARD STEEL CORPORATION

General Offices & Plant, 5093 Boyle Avenue, Los Angeles 58, California

Midwest Offices & Plant **LEADER IRON WORKS** *Decatur 93, Illinois*

(Division of Standard Steel Corporation)

ROTARY DRYERS • KILNS • COOLERS • ASPHALT PLANTS

NEW
USE HORN'S
AYR-TRAP

powerful new air entraining agent

Ayr-Trap is much more effective than other concrete air entraining agents—complies with major Federal and State Specifications including ASTM-C260-54. Newly formulated, Ayr-Trap is both economical and efficient in mixing for structural masses, paving, flooring, pipes and blocks. Less than 1 ounce per bag of cement does the job.

Ayr-Trap is *guaranteed* to retain its efficiency throughout storage. For complete details, write for our 4-page Ayr-Trap Catalog to Dept. H57-8101.

A. C. Horn Companies
SUBSIDIARIES AND DIVISIONS
Sun Chemical Corporation
10th Street & 44th Avenue, Long Island City 1, N. Y.

From our 50th Anniversary Album

SHEETING AND BRACING PROTECTION OF 30′ CUT ALONG WEST BROADWAY, N. Y. C.

Underpinning & Foundation Co., Inc. installed the steel bearing piles, underpinning adjoining structures and protected deep excavation banks for this unusual and difficult foundation job at Washington Square for the new Loeb Student Center of New York University. Caristo Construction Corp., Gen. Contractors; Harrison & Abramovitz, Architects; Edwards & Hjorth, Struc. Eng.

Service
Experience
UNDERPINNING AND FOUNDATION CO

✓PILING ✓FOUNDATIONS ✓SHORING
✓UNDERPINNING ✓CONSULTATION & DESIGN

UNDERPINNING & FOUNDATION CO., INC.
155 E. 44 St., New York 17, N. Y.
General Contractors for 50 Years
Inquiries are invited — no obligation

Careers

Public Works

Fred E. Hart, former city engineer and building commissioner of Hamilton, Ohio, has become director of public works in Zanesville, Ohio.

Joseph C. Patterson, now resident engineer at Hills Creek Dam in Oregon, will head up Army Engineer construction at the $100 million Atlas ICBM base at Cheyenne, Wyo.

Theodóre Kunkle has been appointed city engineer of Bryan, Ohio, succeeding **Donald Olmstead** who resigned.

John Davis, city engineering commissioner of Toledo, Ohio, has transferred to the post of commissioner of harbors and bridges.

Retirements

Col. Roland C. Brown, deputy division engineer, North Central Army Engineer Division, Chicago, for the last 18 months, retired March 1 after 30 years of active military service. A graduate of the U. S. Military Academy, Colonel Brown will be associated with overseas construction operations of Raymond International, New York City.

Raymond W. Hess, has retired as coordinator of pollution research for the National Aniline Division of Allied Chemical & Dye Corp., Buffalo, N. Y., after a career of nearly 40 years with the company. He plans to continue in pollution abatement as a consultant.

R. A. Van Ness, bridge engineer, Santa Fe Railway System, since 1929, has retired. A graduate of Ohio Northern University with a B.S. of C.E. degree in 1914, he was employed by the Santa Fe for 40 years.

Business

Zachary Sherman, civil engineering professor at the University of Mississippi, will open a consulting office in Memphis June 9. He will specialize in the design of bridges, substructures, industrial buildings and prestressed concrete.

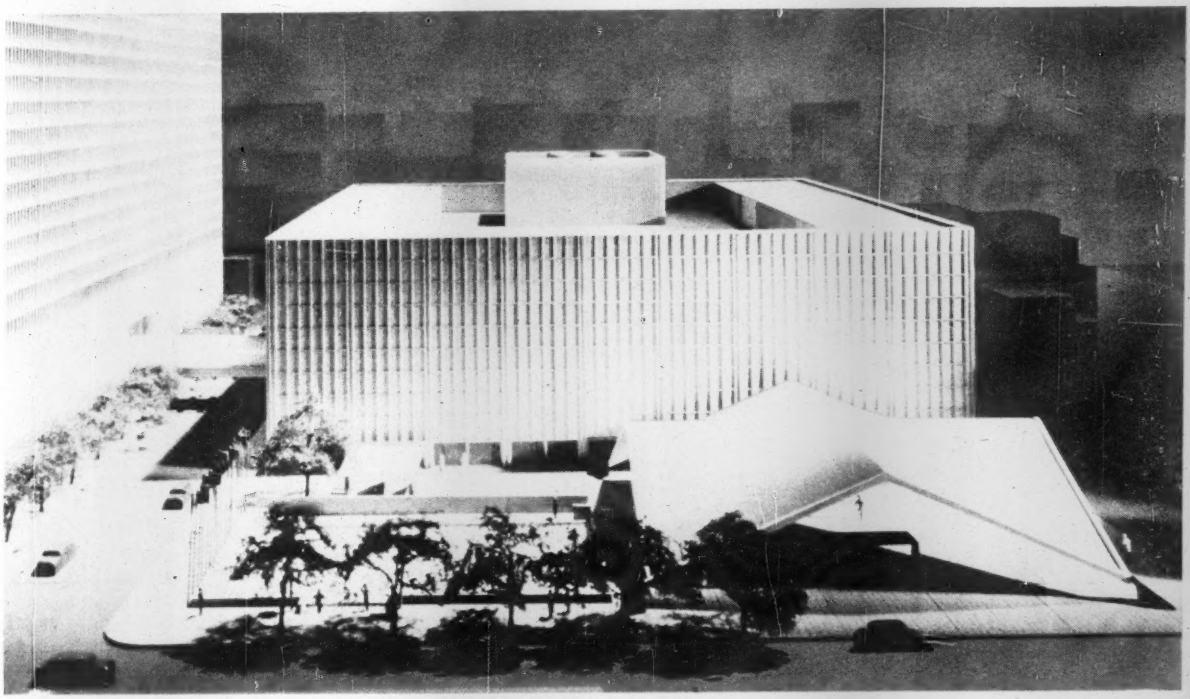
Louis F. Hewett has joined Leonard S. Wegman Co., consulting engineer of New York City, as project engineer.

Dave Steel Corp. is the new name for the former Oregonia Bridge Co. of Lebanon, Ohio. The firm is devoted mainly to structural steel fabrication for contractors and industrial plants. It operates the Lebanon plant as an expansion of the original Dave Steel Corp. of Asheville, N. C.

Edwin H. Krieg, vice president and consulting engineer of Stone & Webster Engineering Corp., New York City, has been elected a director of that company. A leading authority on power

The New Age of Concrete

brings greater architectural beauty and new structural form to buildings



An unusual example of the adaptability of concrete is shown in the foreground structure of the Court House Square Project developed by Webb & Knapp in Denver. Technically known as a hyperbolic paraboloid, this cast-in-place concrete shell, resting on four corners only, is self-supporting, requiring no columns or interior supports of any kind.

The beauty, economy, clean lines, grace, and enduring qualities of architectural concrete buildings make them an easy choice for almost any type of use. New finishing techniques and new concepts of structural design make possible unlimited selection of building shapes and appearance.

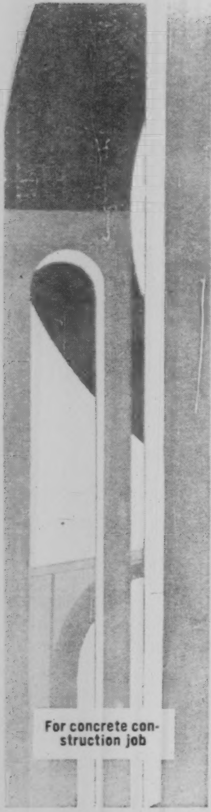
Ideal Cement is produced in 15 plants extending from the West Coast through the Rocky Mountain region, the Southwest, and the Deep South, which assure an ample supply of Portland cement for any architectural use.

PORTLAND IDEAL CEMENT

IDEAL CEMENT COMPANY

DENVER, COLORADO

15 Plants and 4 Terminals Serving Some of the Most Rapidly Growing Areas of the Nation.



GUARANTEE SPECIFICATION COMPLIANCE WITH HORNCURE

concrete curing compounds

✻ **Horncure 30:** 100% Resin Base Compound; complies with ASTM Specification C-309-53T. Paints or flooring adhesives can be applied over concrete cured with Horncure 30 after proper surface preparation.

✻ **Horncure 40:** White Pigmented Concrete Curing Compound guaranteed to comply with U. S. Army Specification CRD-C-300-55; meets or exceeds most Federal, State, Municipal specifications for white pigmented curing compound.

✻ **Horncure 50:** Wax Resin Base Compound guaranteed to comply with Navy Specifications No. 13yd and NAV docks Typical Specification Jib., Jul. 1945, Addendum #1, Mar. 1951; plus American Assn. of State Hwy. Officials Specification AA-540-148.

✻ **Horncure 60:** Wax Resin Base Compound guaranteed to meet most municipal specifications.

A. C. Horn offers one or more concrete curing compounds for every application, interior or exterior, horizontal or vertical, above and below grade.

For condensed data, see Sweet's; or, write to Dept. H13-441 for the new 4-page Horncure catalog.

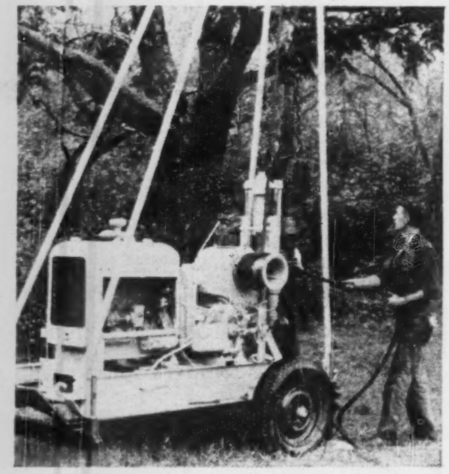
A. C. Horn Companies
SUBSIDIARIES & DIVISIONS
Sun Chemical Corporation
750 Third Avenue, New York 17, N. Y.

ACKER DUAL-PURPOSE CORE DRILL AIDS FEDERAL HIGHWAY PROGRAM

Acker gives you more for your money because the essential accessories that you'll want and need are included right in the basic models. For instance, the dual-purpose rig shown in operation on the Penn-Can Highway is ready to operate anywhere! It's completely self-contained with its own power plant, built-in pump, cargo-type hoisting winch, full 360° operating hydraulic feed head and dozens of other useful features. This particular derrick equipped rig was designed to operate from the trailer, or slid-off and used on its skid base.

If you have a drilling or soil sampling problem write us today. There's no obligation. Or, if you want information and prices on the equipment featured in this ad, write for Bulletin 30 ENR

Do you have the latest Acker Drill Supplies Catalog 58? If you drill, you'll want Acker Catalog 58. It's free for the asking!



ACKER DRILL CO., Inc.
P.O. BOX 830 • SCRANTON, PA.

Over 40 years of experience manufacturing a complete line of diamond and shot core drills, accessories and equipment

plant design, Mr. Krieg is credited with several advances in technical development and application of steam turbine generators.

Honors

Louis R. Howson, of Alvord, Burdick & Howson, consulting engineers, has been named to honorary membership in the Chicago Engineers' Club.

Bertram D. Tallamy, federal highway administrator, has been made a national honorary member of Chi Epsilon. He is the first to be chosen in four years and the twenty-second ever to receive the honor. Initiation ceremonies were at Rensselaer Polytechnic Institute.

Thomas C. Kavanagh of Praeger-Kavanagh, Engineers, New York City, has received the $500 D. B. Steinman Award for Research in Structural Engineering, presented by the New York Academy of Sciences. Mr. Kavanagh received the award for his paper on "Rational Simplifications for the Buckling Lengths of Columns."

Education

Donald Metzler, professor of mechanics and hydraulics at the State University of Iowa and member of that faculty since 1945, becomes professor of applied mechanics and associate dean of the University of Kansas School of Engineering and Architecture effective July 1. He received a B.S. degree in mechanical engineering from Kansas University in 1939 and a master's degree in hydraulic engineering from the State University of Iowa in 1948.

Mario J. Goglia has been named to succeed **Karl E. Schoenherr** as dean of the college of engineering at the University of Notre Dame. Mr. Schoenherr will become technical director of the hydro-mechanics laboratory at the Navy's David Taylor Model Basin in Caderock, Md. Dean Goglia formerly taught mechanical engineering at Purdue and at the University of Illinois.

Associations

Bob O'Rourke, vice president of the O'Rourke Construction Co., has been inaugurated for his second term as president of the Houston chapter of the Associated General Contractors of America, Inc.

Dwight H. Bray, Kentucky State Highway Engineer, is the new president of the Mississippi Valley Conference of State Highway Departments. **George J. Thormyer,** assistant director and chief engineer, Ohio Department of Highways, has been named secretary-treasurer of the association.

Look ahead*...move ahead...*and stay ahead

with Allis-Chalmers construction machinery

fastest growing acceptance in the business...

Everywhere you go, you see more and more Allis-Chalmers construction machines—because they're *doing more*. On big jobs or utility work, they're proving value by performance . . . earning steadily increasing popularity.

HERE'S THE COMPLETE LINE

Allis-Chalmers crawler tractors for every application

83 belt hp to 225 net engine hp
12,200 lb to 45,500 lb bare wt.

. . . plus a complete line of matched bulldozers, side booms, mounted rippers, other attachments.

HD-21

225 net engine hp
torque converter drive
56,260 lb (approx. as shown)

HD-21A illustrated—
Two other models available

4-CU-YD

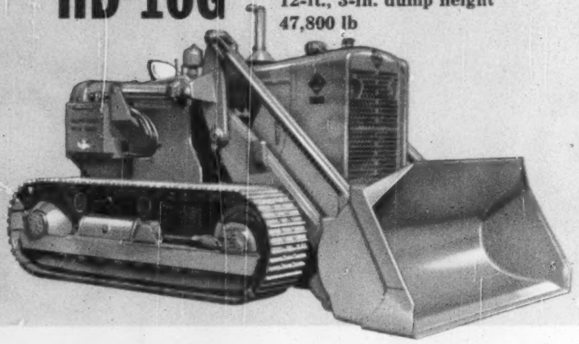
HD-21G

225 net engine hp
13-ft., 4-in. dump height
66,500 lb

3-CU-YD

HD-16G

150 net engine hp
12-ft., 3-in. dump height
47,800 lb



Designed and built for high-volume

Allis-Chalmers motor scrapers and wagons

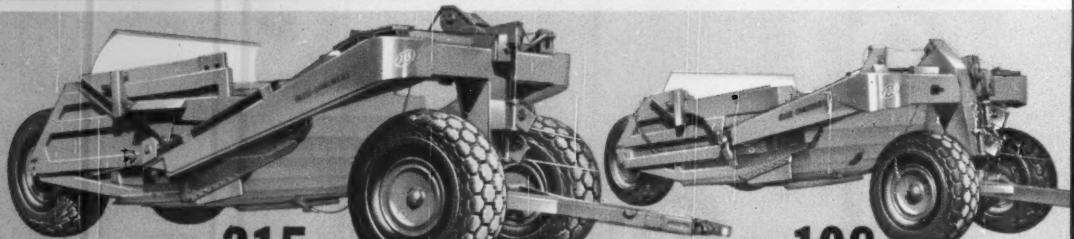
Five models that offer
major advantages on
[illegible] utility work.

TS-360

280 hp
Struck—15 yd • Heaped—20 yd
Weight—49,050 lb (approx.)

TW-360

280 hp • 28 payload tons
Struck—17 yd • Heaped—24 yd
Weight—47,000 lb (approx.)



model 315

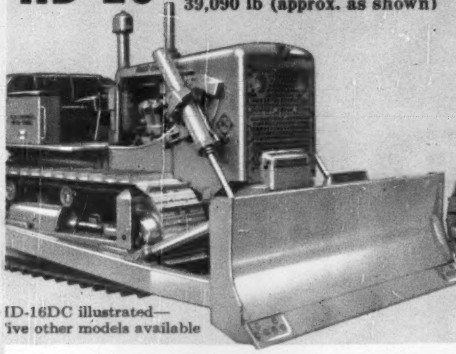
Struck—15 yd • Heaped—20 yd • Cable control • 25,850 lb

model 108

Struck—8.4 yd • Heaped—12 yd
Cable control • 15,250 lb

HD-16

Choice of two outstanding drives
torque converter | all-gear
150 net engine hp | 141 belt hp
39,090 lb (approx. as shown)



ID-16DC illustrated—
ive other models available

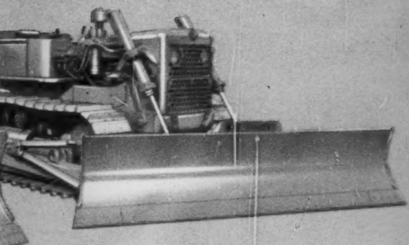
HD-11

94 belt hp
25,960 lb
(approx. as shown)

HD-11B illustrated—
Two other models available

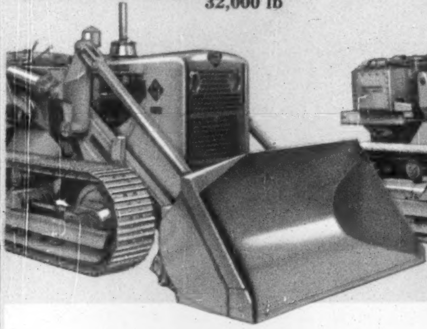
HD-6

63 belt hp
16,470 lb
(approx. as shown)



HD-6E illustrated—
Three other models available

2¼-CU-YD
HD-11G
111 net engine hp
11-ft., 7-in. dump height
32,000 lb

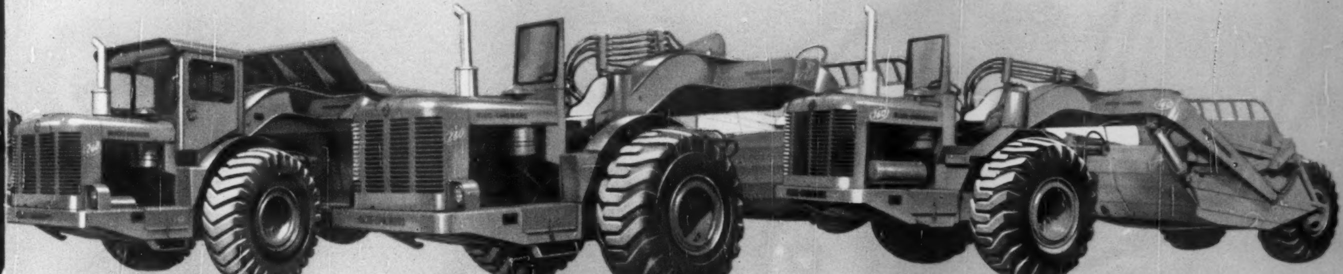


1½-CU-YD
HD-6G
72 net engine hp
10-ft. dump height
19,600 lb

Allis-Chalmers tractor shovels in a full range of bucket sizes

Up to 7-cu-yd capacity to match requirements for various materials and job conditions.

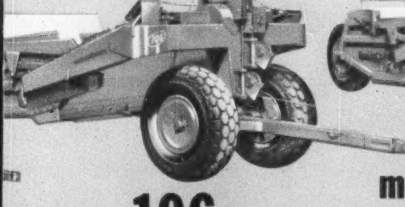
performance you can depend on



TR-260
200 hp • 18 payload tons
Struck—11 yd • Heaped—15 yd
Weight—43,800 lb (approx.)

TS-260
200 hp
Struck—11 yd • Heaped—14 yd
Weight—39,600 lb (approx.)

TS-160
155 hp
Struck—7 yd • Heaped—9½ yd
Weight—28,500 lb (approx.)



model 106
Struck—6.1 yd • Heaped—8.5 yd
Cable control • 10,300 lb

model 44
Struck—4 yd
Heaped—5.4 yd
Hydraulic control
6,595 lb

Allis-Chalmers pull-type scrapers

The only line with low bowl, high apron lift, forced ejection in every size.

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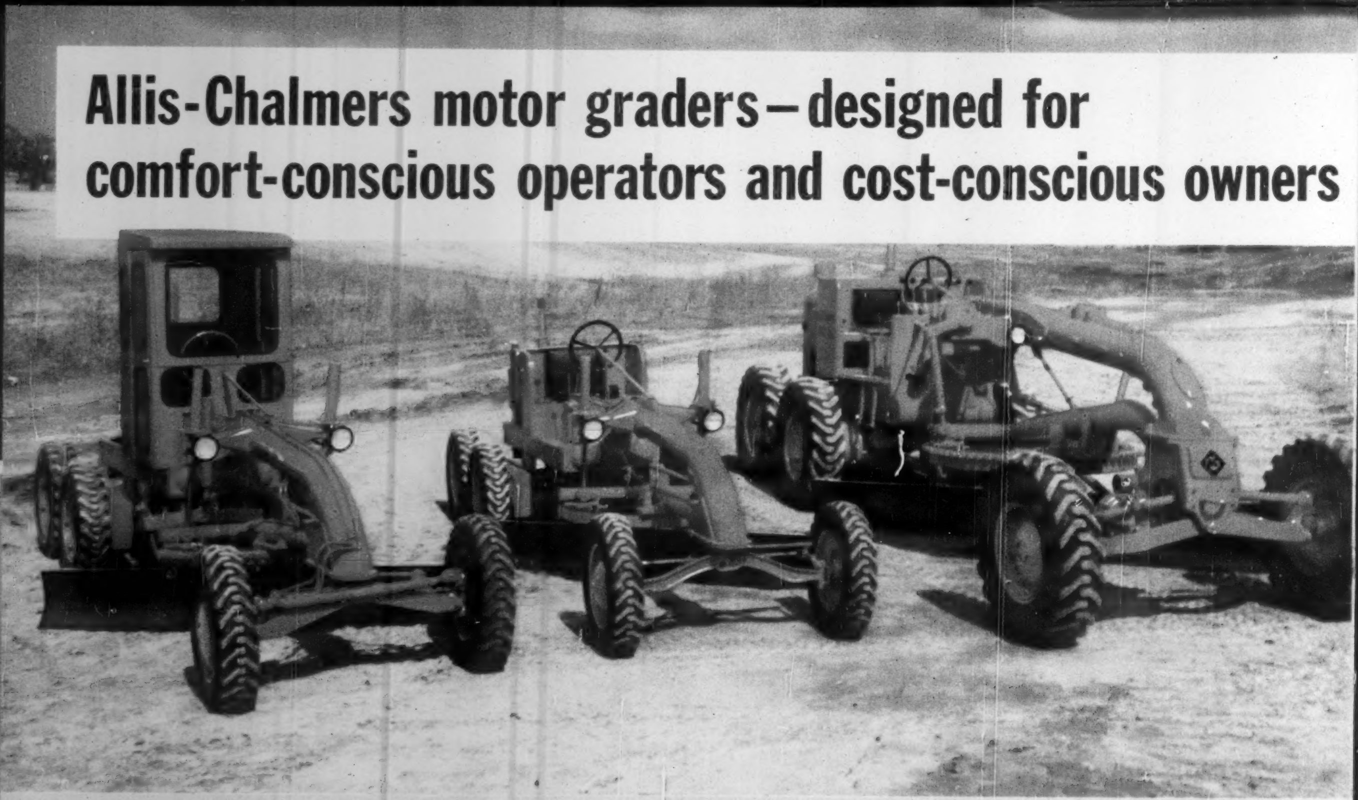

Model D Special

50 brake hp
10,900 lb (gasoline)
11,450 lb (diesel)
4 forward speeds to 25 mph (approx.)
1 reverse speed to 3 mph (approx.)
All-steel cab*

Shiftable moldboard*
Hydraulic scarifier*
Leaning front wheels*
Power circle turn*

**Also available individually with the Model D Standard as optional equipment.*

Rear-mounted attachments available as optional equipment include 5/8-yd loader; shoulder maintainer; windrow eliminator.

Model D Standard

50 brake hp
8,800 lb (gasoline)
9,350 lb (diesel)

FORTY-FIVE

120 brake hp
6 forward speeds to 20.6 mph
3 reverse speeds to 7.0 mph
23,800 lb (approx.)

Ask for a demonstration. Your Allis-Chalmers dealer will be glad to prove the value of any of these machines in a working demonstration. Call him now.

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Obituaries

Howard D. Smith, 72, Ohio State University architect at Columbus, died April 27. He had designed 50 buildings, including a 78,000 capacity football stadium, for the university and also about 25 schools and other buildings in central Ohio. He was a 1907 graduate of Ohio State University.

James A. Lindsey, 67, senior consulting engineer for Lindsey, Carter & Associates, Excelsior, Minn., died April 14. He had participated in design and construction of many civil projects in the upper Midwest.

Walter E. Irving, 85, founder and president of Irving Subway Grating Co., Inc., Long Island City, New York, died May 5. He founded his company in 1902 and manufactured the open-mesh sidewalk grating for New York City's subway system in 1906. During World War II the firm manufactured emergency airfield landing mats. Mr. Irving was an 1896 graduate of Rensselaer Polytechnic Institute.

Frederick E. Harvey, Honolulu civil engineer, died May 6 after a 60-year career in the Hawaiian Islands.

Percival H. Keays, founder of P. A. Keays & Associates of Canada and the U. S., consulting engineers, died April 13 in Hamilton, Ont.

James M. Tough, district manager of the Atlanta territory for the Forge and Fittings Division, W-S Fittings Works, H. K. Porter Co., Inc., died May 10th in Atlanta.

Capt. Alden K. Fogg, 66, CEC, USN (ret.), veteran of more than 30 years of Naval service, died April 25 in San Diego, Calif. After retirement from the Navy's Civil Engineer Corps, Captain Fogg became city engineer for the city of San Diego.

Jean M. Allen, 79, consulting engineer and Naval architect, died April 12 in Los Angeles. During the last 50 years he designed over 90 clamshell, dipper and hydraulic dredgers and had executive charge of dredging contracts covering dipper, clamshell and hydraulic dredging work.

James M. Holm, 89, retired builder and former assistant superintendent of highways in Delaware County, died May 12 in Highland Park, Pa. He was a graduate of the Drexel Institute of Technology.

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ILLINOIS TOLLWAY PHOTOGRAPH

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Books

Water Law Symposium

The Law of Water Allocation in the Eastern United States—A symposium edited by David Haber and Stephen W. Bergen. 643 pp. The Ronald Press Co., 15 E. 26 St., New York 3, N. Y. $7.50.

This timely book contains 12 papers and the discussion that followed at a symposium on eastern water law held October 1956, in Washington, D. C., under the auspices of The Conservation Foundation.

A number of water law authorities have praised the symposium as an excellent base upon which to build modifications of the eastern riparian doctrine. Thus, the gathering together of all the contributions comes as a welcome effort.

Although primarily concerned with eastern problems, the western states' prior appropriation doctrine of water law is fully discussed as it could—and could not—be applied in the East.

None of the authors or contributors contend that eastern law doesn't have a good many deficiencies. Most of them, however, believe much more study of the legal and engineering problems associated with water resources development is required before drastic law changes are passed. The point is made that water law should not be enacted in principle alone; the law must meet the problems that exist for the particular state in question.

The book also points out that in a growing number of water-short areas in the East, development of additional supplies cannot proceed until more equitable means of allocating the available water among existing and prospective users are enacted. So in a few areas, at least, modification of easter water law is, indeed, an immediate problem.

Continuous Frames

Indeterminate Structural Analysis—By J. Sterling Kinney. 655 pp. Addison-Wesley Publishing Co., Inc., Reading, Mass. $9.50.

Engineers, and students, too, interested in an up-to-date treatment of continuous-frame analysis that assumes no previous knowledge of statically indeterminate structures would do well to acquire a copy of this book for study and reference.

Completed shortly before the author's untimely death, the book covers a wide variety of techniques. A feature is a chapter on model analysis of structures, based on the author's experience in developing the structural model laboratories at Rensselaer Polytechnic Institute. That chapter discusses various materials used for model analysis, basic theory and dimensional analysis. Equipment surveyed includes deformeters, contact indicators and the brass spring model for articulated structures.

Among the technique presented for statically indeterminate analysis in the book are the energy methods, principle of virtual work, moment areas, conjugate structures, column analogy and moment distribution. In addition to straight members, arches also are treated.

Many engineers will appreciate the brief history of structural theory in the opening chapter.

Composite Design Manual

Composite Construction in Steel and Concrete For Bridges and Buildings—By I. M. Viest, R. S. Fountain and R. C. Singleton. 192 pp. McGraw-Hill Book Co., New York, N. Y. $7.50.

This is an engineering manual on how to design steel beams and concrete slabs to function compositely as T-beams.

Relatively few design aids have been available heretofore for this type of construction although it has been in wide use for about 25 years, particularly for bridges. Aids that have been available have not been in a form suitable for easy reference. To fill this lack was a major aim of the authors in preparing the book.

The volume is intended for those already familiar with ordinary design of concrete slabs and steel beams, and the subject is concisely handled, as a design manual should be. However, the user is not abandoned to flounder his way unaided through a labyrinth of formulas. He is guided, instead, by short explanatory transitions interposed between technical steps.

The authors define composite construction, enumerate its advantages, develop equations and procedures for its design and describe methods of connecting slabs to beams. With six detailed examples they take the reader through a rapid method of composite design developed especially for this book. Such problems as length determination of cover plates, continuous-beam design and computation of deflections are covered. The methods and examples follow the 1957 bridge design specifications of the American Association of State Highway Officials.

Design methods are included for the three most commonly used shear connectors: welded studs, channels and spirals. A special section treats the stud connector, which has been gaining rapidly in popularity since its first major use about three years ago.

Although the authors have placed greater emphasis on bridge design than on building design (because composite construction is more common for bridges than buildings), they have incorporated a 24 page appendix consisting of suggestions for and examples of a composite design for buildings. In the absence of any existing specifications for composite design of building elements, the suggestions are formulated with reference to specifications of the American Institute of Steel Construction and the American Concrete Institute regarding construction in steel and concrete, respectively.

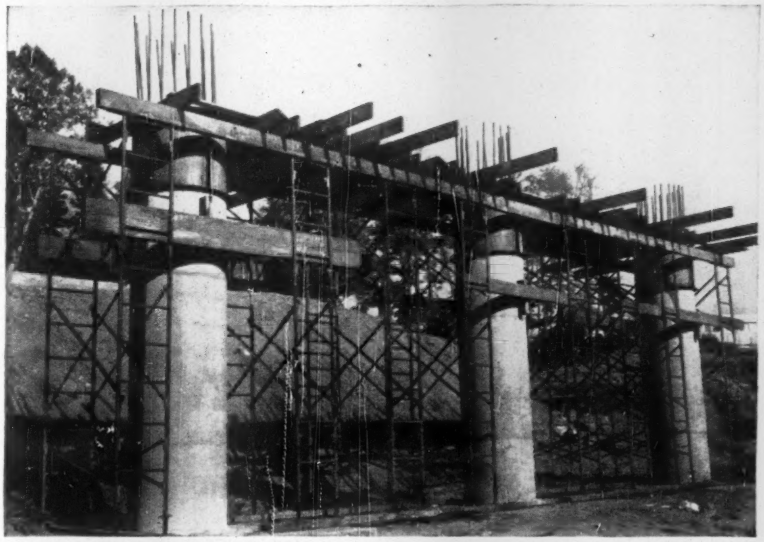
For those who want to go more deeply into composite construction, one chapter of the volume is a classified bibliography. It contains 57 references in three categories: research, design and construction.

Reports and Pamphlets

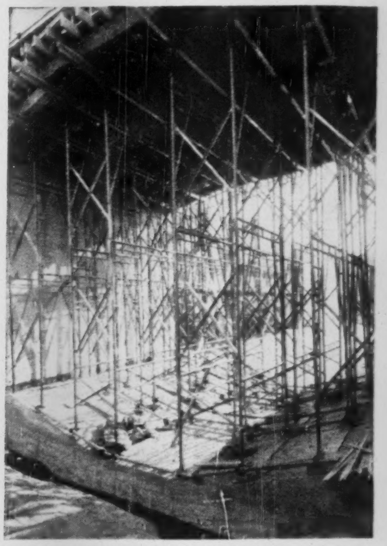
• **Multipurpose river development**—The United Nations Department of Economic and Social Affairs has published a 60 page report of an expert committee titled "Integrated River Basin Development." It discusses in layman's terms most of the very complex problems faced in multipurpose river development. Thus, the publication serves both to provide the expert water engineer with perspective and the neophyte with an extraordinarily broad and easily understood introduction. Especially commendable in the pamphlet is a section on economic evaluation of water resources' projects, which analyzes the shortcomings of the "cost-benefit" ratios employed in the U. S. Copies of the pamphlet may be obtained for 70 cents from Columbia University Press, 2960 Broadway, New York, N. Y.

• **Vehicle size laws**—Free copies of the 1958 edition of Truck and Trailer Size and Weight Restrictions may be obtained from Four Wheel Drive Auto Co., which has been preparing and issuing the booklet since 1933. The pocket-size issue compiles the laws of all 48 states and the District of Columbia regulating size and weight of trucks and trailers. Data presented in most cases is likely to hold until mid-1959. Write to Public Relations Dept., Four Wheel Drive Auto Co., Clintonville, Wis.

(*Books continued on page 190*)

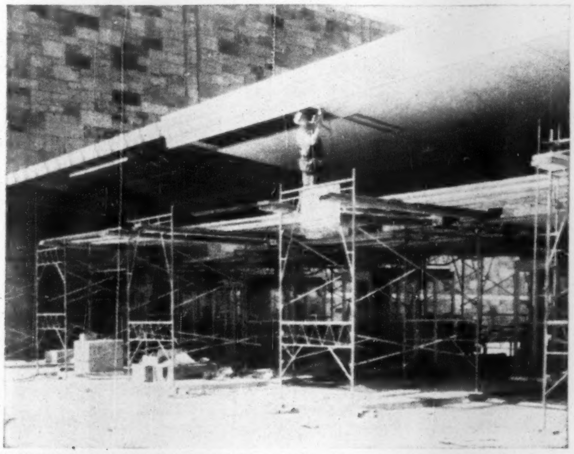


QUICK PIER BEAM SUPPORT—"Trouble Saver" 2'-wide Ladder Scaffold frames spaced 5' apart help contractor, M.D.A. Construction Co. provide easy access for forming work and support for one of 20 bridge piers on the Cross-Westchester Expressway, White Plains, N.Y. This photo shows forming and support for a pier beam 42"x48" deep, 14' high. Many users of "Trouble Saver" Shoring say "its ease of handling means quicker job completion." Complete, accurate shoring layouts are a regular part of PS Co's engineering service available thru nation-wide offices or representatives that *sell* or *rent* "Gold Medal"® Scaffolds.



CONFORMING TO CURVES—Guy F. Atkinson Co., contractor, uses "Trouble Saver" Shoring to support Pacific Electric Ry. Co. concrete bridge, Los Angeles, over a sloped concrete channel base. Adjustable legs help meet both curves, top and bottom. Note 4" steel I-beams as stringers, furnished by PS Co.

Shoring Methods . . . for Highway Construction by The Patent Scaffolding Co., Inc.



FINISHING OPERATIONS—On toll booths at the New Jersey Plaza for the New York—New Jersey Lincoln Tunnel these "Trouble Saver" fixed Scaffolds are used to provide safe, level platforms for finishing work. The scaffolding components used here are the same as those used for shoring operations. By assembling them in towers and spacing to take the load, practically any shoring job can be done.

EASILY HANDLED BRIDGE SHORING—5'-wide prefab "Trouble Saver" Sectional Steel Shoring frames are handled easily by the crew for T. M. Page and RCT Corp., joint venturers, to obtain the correct support for the Cajon Blvd. Bridge over Devil's Creek Diversion Channel, San Bernadino, Calif. Two 6'6"-high frames, with extension legs, give 14' height. 4" steel I-beams used as stringers. 3'7" spacing between frames.

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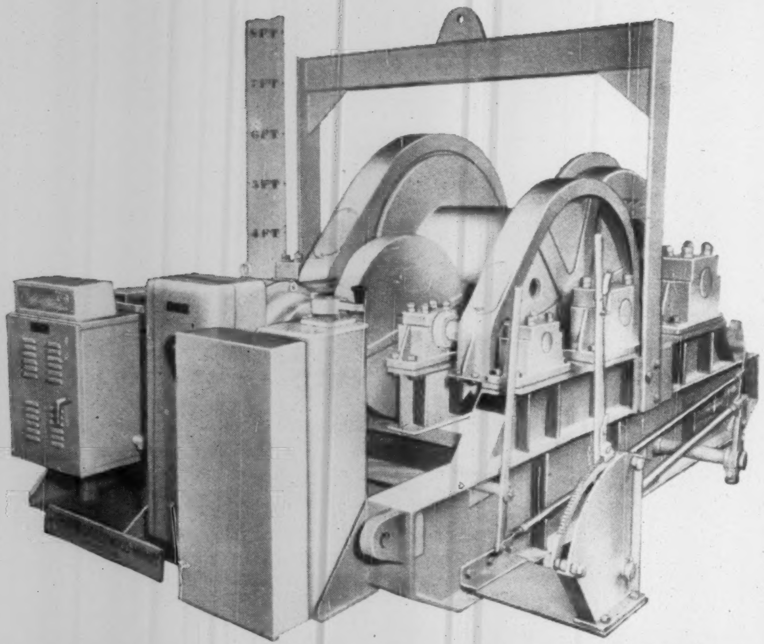

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• **Industrial water**—The United Nations Department of Economic and Social Affairs has published a 44 page report entitled "Water For Industrial Use." It contains a review of problems arising from the demand for water by industry in competition with older and more traditional claims on water resources. The publication deals with quality and quantity aspects. Industrial water costs are analysed and possible means of conserving limited resources are discussed. Suggested action to be taken at national and international levels is included. Copies are 50 cents, from Columbia University Press, 2960 Broadway, New York 27, N. Y.

• **Sanitary engineering film**—The U. S. Public Health Service has made available a film explaining sanitary engineering as a professional career. The film, titled "Engineering Your Health," is in color and will run 13½ minutes. It is aimed at freshman and sophomore collegiate students who are science-minded or thinking about an engineering career. The film's purpose is to provide incentive rather than instructions. It may be borrowed from Public Inquiries, U. S. Public Health Service, Washington 25, D. C.

• **Nuclear Safety**—Articles on various phases of design for nuclear safety have been written by staff members of the newly formed Nuclear Division of Holmes & Narver, engineers and constructors of Los Angeles. Included are "Vessel Design for Explosive Mixtures" (16 pp.), "Fragment Effects on Structural Elements" (11 pp.), and "Reactor Hazards Analysis (4 pp.). Copies of any of these articles are available on request from Holmes & Narver, 828 S. Figueroa St., Los Angeles 17, Calif.

• **Dissolved oxygen determination**—A collection of papers presenting the best current information on methods and apparatus for determining dissolved oxygen in water is available. Both manual spot-check methods and those using instruments providing continuous indication and record are described. Papers included are: Polarographic Measurement of Dissolved Oxygen; Study of the Accuracy of Methods of Testing for Dissolved Oxygen in High Purity Water; Beckman Dissolved Oxygen Analyzer; Evaluation of Hartmann and Braun Dissolved Oxygen for Boiler Feedwater; and Determination of Dissolved Oxygen by Means of a Cambridge Analyzer. The 64 page book, Special Technical Publication No. 219, can be obtained from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. for $2.25.

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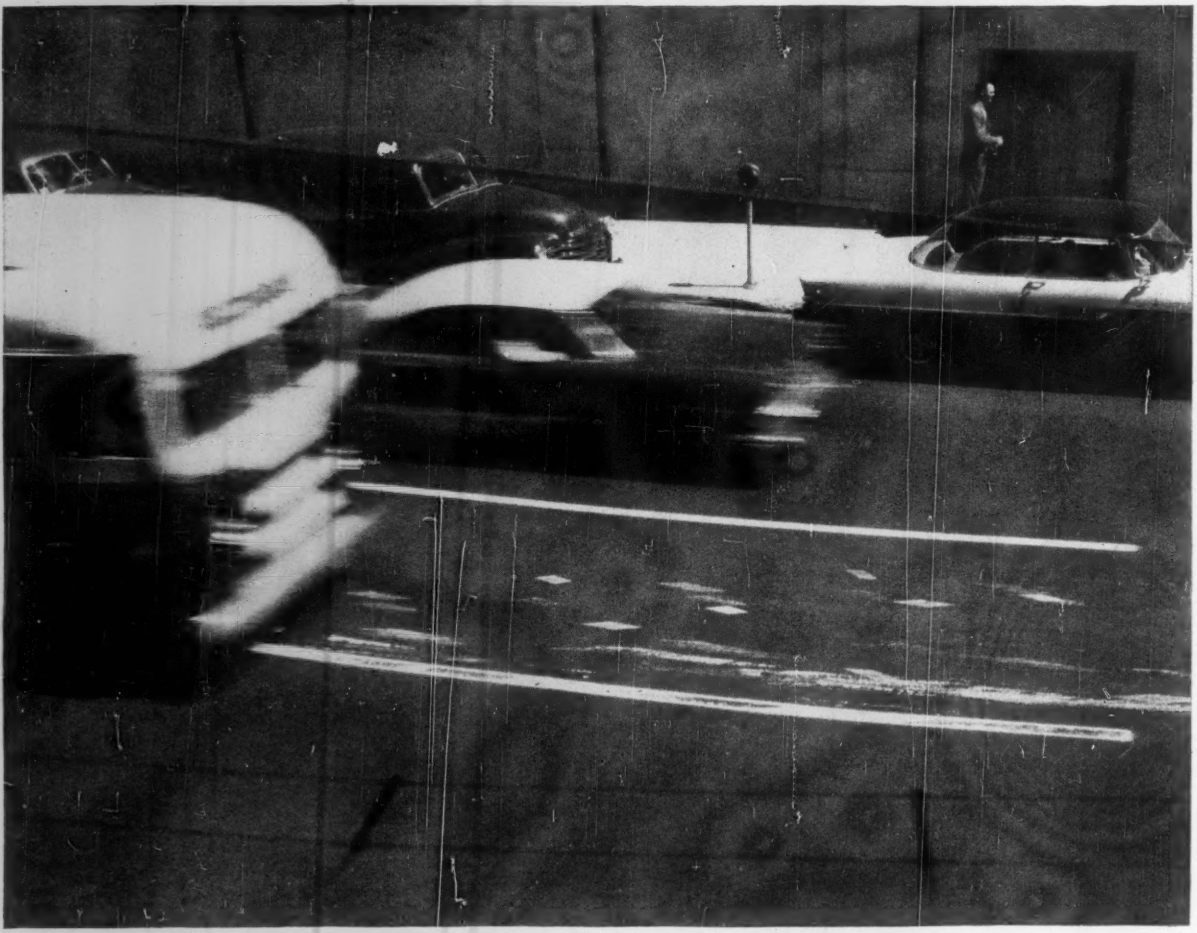

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J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, D. TARTAGLIA, Reports
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

† **Mass., Bedford**—AIRFIELD PAVEMENT, etc.—BA 6/26—U. S. Eng., 150 Causeway St., Boston, Mass., airfield pavement and lighting, Laurence G. Hanscom Field, ENG-19-016-58-224. $75,000-$125,000. CD 6/3.

† **Me., Bangor**—AMMUNITION STORAGE FACILITIES—BA 6/26—U. S. Eng., 150 Causeway St., Boston, Mass., AMMO storage facilities, Dow Air Force Base, ENG-19-016-58-191. 600,000-$700,000. Plans deposit $10. Joseph L. Paley, 105 Newbury St., Boston, Mass., engr. CD 6/2.

† **Me., Bangor**—READY AIRCRAFT SHELTER—BA 6/26—U. S. Eng., 150 Causeway St., Boston, Mass., ready aircraft shelter, Dow Air Force Base, ENG-19-016-58-192. $400,000-$500,000. Plans deposit $10. Congdon, Gurney & Towle, Inc., 53 State St., Boston, Mass., engr. CD 5/29.

BUILDINGS—BA

Mass., Cambridge—CHEMICAL LABORATORY—BA 6/25 Harvard University, Dpt. Bldgs. & Grounds, 175 North Harvard St., (selected list bidders), chemical laboratory, 12 Oxford St. $500,000-$1,000,000. Voorhees, Walker, Smith & Smith, 101 Park Ave., New York, N. Y., archts. CD 2/21.

▲† **Mass., Winthrop**—MISSILE MASTER FACILITY—BA 6/26—U. S. Eng., 150 Causeway St., Boston, missile master facility at Fort Heath, ENG-19-016-58-190. $1,000,000-$1,500,000. Plans deposit $50. CD 6/2.

▲† **Mass., Waltham**—DORMITORIES, etc.—BA 6/30—Brandeis University, 415 South St., Waltham, HHFA Proj. Mass. 19-CH-25(D) four men's dormitories and dining center on Campus. $1,000,000. Harrison & Abramovitz, 650 5th Ave., New York, N. Y., archts. CD 2/1.

Mass., Westwood—SCHOOL—BA 7/1—Town, Richard W. Stewart, bldg. comn., Junior High School, High St., Junior High School addn., $700,000. Plans deposit $100. Rich & Tucker Assocs., 45 Newbury St., Boston, Mass., archts. CD 3/21.

Conn., Milford—SCHOOL—BA 7/2—Town, Town Hall, Walnut Beach Elementary School. $450,000. Extended date. Jesse J. Hamblin, 1188 Main St., Bridgeport, archt. CD 5/28.

▲ **Mass., North Adams**—SCIENCE-GYMNASIUM, etc.—BA 7/2—Commonwealth of Mass., Dpt., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, E-57-15, science, gymnasium and auditorium bldg. at State Teachers College. $1,082,000. Plans deposit $100. William Hoskins Brown Assoc., Inc., 344 Boylston St., Boston, archts. CD 6/14.

▲ **Mass., Concord**—SCHOOL—BA 8/5—Towns Concord and Carlisle, Supt. Schools, Concord, Regional High School Rte. 2 and Walden St. $2,225,000. Warren H. Ashley, 726 North Main St., West Hartford, Conn., archt. CD 10/10.

BUILDINGS—SLC

▲ **Conn., Hartford**—HOSPITAL WING—St. Francis Hospital, 114 Woodland St., soon lets contract 4 story buff limestone hospital wing incl. medical library, altering existing bldgs. $3,000,000. Extended date. York & Sawyer, 101 Park Ave., New York, N. Y., archts., Jansen & Rogan, 500 Fifth Ave., New York, N. Y., engrs. CD 5/23.

▲ **Mass., Bedford**—FLIGHT TEST FACILITY—Raytheon Mfg. Co., Foundry St., Waltham, soon lets contract facility, flight test addn. (missile laboratory) cantilever type steel, off Hartwell Rd. $1,500,000. Fay, Spofford & Thorndike, 11 Beacon St., Boston, engrs.

HEAVY CONSTRUCTION—LB & CA

▲† **J. R. Cianchette**, P. O. Box "M", Pittsfield, Md., CA **$3,209,472** est. $3,653,036, operational apron and hydrant sys., Dow Air Force Base, ENG.-19-016-58-159, BANGOR, ME. U. S. Eng., 150 Causeway St., Boston, Mass. Bids May 23. CD 5/28, under LB.

† **Consolidated Constructors, Inc.**, 807 Congress St., Portland, Me., CA **$707,129** est. $704,713, AMMO Storage facilities ADC Type, Loring Air Force Base, ENG.-19-016-58-160, LIMESTONE, ME. U. S. Eng., 150 Causeway St., Boston, Mass. Bids May 28. CD 6/5, under LB.

▲† **Lane Constr. Co.**, P. O. Box 911, Meriden, Conn., CA **$1,798,985**, est. $1,929,136, SAC and operational apron ADC, Loring Air Force Base, ENG.-19-016-58-161, LIMESTONE, ME. U. S. Eng., 150 Causeway St., Boston, Mass. Bids May 23. CD 5/28, under LB.

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

Coleman Brothers Corp., 85 Sprague St., Readville, Mass., CA **$2,465,213**, est. $2,683,690, hy. constr. Rte. 6 to Horseneck Beach, S 114 (2), Westport. Charles A. Maguire & Assoc., 14 Court Sq., Boston, archts. Bids May 20. CD 5/22, under LB.

▲ **CONNECTICUT**—State Hy. Dpt., 165 Capitol Ave., Hartford, Bids opened 6/9,

Oneglia & Gervasini, Inc., Casson Ave., Torrington, Conn., LB **$1,007,244**, est. $1,300,000 (8 bidders) 6 span prestressed concrete bridge over Naugatuck River and single span rolled beam bridge over Brook on ext. of Route 68 incl. 1,091 lin. ft. bit. pavement, Proj. 87-78, FA Proj. US 80-(1), Naugatuck-New Haven. CD 5/14.

▲ **CONNECTICUT**—State Hy. Dpt., 165 Capitol Ave., Hartford, Bids opened 6/9,

Arute Bros., Inc., 560 South Main St., New Britain, Conn., LB **$2,761,146**, est. $3,500,000, Proj. 46-68, approx. 15,650 lin. ft. grading, drainage, reinf. concrete pavement on section of Hartford-Springfield Expressway, incl. 6 grade separation structures, FAP 1-139 (18) East Windsor and Enfield. CD 5/22.

† **S. T. G. Constr. Co., Inc.**, 82 Beaver St., New York, N. Y., LB **$85,200**, est. $150,814, Schedule 1, LB **$160,000**, est. $254,156 schedule 6, LB **$409,400**, est. $726,634 Schedule 8, imprvs. conversions NIKE elevators, Bridgeport and Hartford, ENG.-19-016-58-138, CONNECTICUT. U. S. Eng. Area Office, 187 Westminster St., Providence, R. I. Westcott & Mapes, Inc., 109 Church St., New Haven, Conn. engr. Bids May 15, CD 5/1.

† **Angelo Tomasso, Inc.**, Warren St., New Britain, Conn., LB **$906,029**, (7 bidders) Proj. B1-CC-80, extension of Runway 6-24, Bradley Field, WINDSOR LOCKS, CONN. State P. Wks. Dpt., 165 Capitol Ave., Hartford, Conn. Bids June 4, CD 5/26;

Associated Constr. Co., 1010 Wethersfield Ave., Hartford, Conn., LB **$343,000** (3 bidders) Proj. B1-CC 75 B, expansion of terminal bldgs (second stage) Bradley Field, (Windsor Locks, Conn.)

BUILDINGS—LB & CA

▲ **Harvey Constr. Co., Inc.**, 1662 Elm St., Manchester, N. H. LB Approx. **$1,000,000.** BANK, CONCORD, N. H. Mechanics National Bank, 83 North Main St., and New Hampshire Savings Bank, 98 North Main St., Concord, N. H. Bids May 27. CD 5/19.

▲† **Jefferson Constr. Co.**, 75 First St., Cambridge, Mass., CA **$8,440,787**, est. $7,949,714, FAMILY HOUSING at Otis Air Force Base, ENG-19-016-58-157, FALMOUTH, MASS. U. S. Eng., 150 Causeway St., Boston, Mass. Bids May 27. CD 6/3, under LB.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England
Middle Atlantic
South
Middle West
West of Mississippi
Far West

PROPOSED WORK
Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Public Buildings
Mass Housing
Commercial Buildings
Industrial Buildings
Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

M. I. O'Connor, Inc., 694 Bridge St., Northampton, Mass., LB **$973,900**, Proj. Mass. 5-3: low-rent HOUSING (98 units), Canal, Lyman, Summer and Albion Sts., HOLYOKE, MASS. Holyoke Housing Auth., Jackson Parkway, Holyoke, Mass. Bids June 6. CD 5/20.

▲ **Vappi & Co. Inc.**, 240 Sidney St., Cambridge, Mass., CA **$1,653,924**, Men's DORMITORY, WORCESTER, MASS. Clark University, 950 Main St., Worcester, Mass. Bids May 21. CD 5/27, under LB.

▲ **Vara Constr. Co., Inc.**, 718 Huntington Ave., Boston, Mass., CA **$1,577,000**, est. $1,600,000, Forest Grove JUNIOR HIGH SCHOOL, Grove and Forest Sts., WORCESTER, MASS. City, School Dpt., Worcester, Mass. Bids May 28. CD 6/5, under LB.

Samp Mortar Lake Co., 425 Brookside Dr., Fairfield Conn., Owner Builds, **$410,000.** 41 HOUSES, Fairfield Woods Rd., FAIRFIELD, CONN. CD 11/15/56.

Casey Constr. Co., Inc., Ridgewood Rd., Wallingford Conn., CA **$527,000.** 50 HOUSES, Earle Ave., HAMDEN, CONN. Linehan Realty Co., 3000 Whitney Ave., Mount Carmel, Conn. Awarded June 5. CD 3/13/57

Linehan Development Corp., Hamden, Conn., Owner Builds **$790,000.** 79 HOUSES, Burnt Plains Rd., MILFORD CONN.

Pearce Constr. Co., 393 State St., North Haven, Conn., LB **$416,000**, (13 bidders) 2 story, 25,000 sq. ft. 102-bed, brick, steel, cinder blocks, 3 wings, HOME FOR AGED, Springside Home, NEW HAVEN, CONN. City, Bureau Purch., 200 Orange St., New Haven, Conn. Bids June 4, CD 5/21.

Costello Constr. & Eng. Corp., Kitts Lane, Newington, Conn., CA **$700,000.** 140 x 342 ft., masonry, steel, air-conditioned, RECREATION CENTER, BOWLING ALLEY, Berling Turnpike, NEWINGTON CONN. Fred H. Callahan Jr., 2111 Berlin Turnpike, Newington, Conn. Awarded June 5. CD 4/16.

Investors' Mortgage Co., 181 State St., Bridgeport, Conn., Owner Builds. **$442,000.** 17 HOUSES, "Pleasant Valley Estates", Church Hill Rd., REDDING RIDGE, CONN.

Barney Commaro, 2281 East Main St., Bridgeport, Conn., Owner Builds, **$400,000**, 80 HOUSES, Mohgegan Rd., SHELTON, CONN.

Abner Rosenberg, et als, 142 Orange Ave., West Haven Conn., Owner Builds. **$600,000.** 2 story, 76-unit, garden type APARTMENT, Main St., WEST HAVEN, CONN. CD 6/26/57.

MIDDLE ATLANTIC

BUILDINGS—BA

▲ **N. Y., Mohegan Lake**—SCHOOL—BA 7/2—Bd. Ed Central School Dist. No. 1, Mohegan Lake, gene constr., plumbing, heating and ventilating, elect and food service equip. Lakeland high school addn U. S. Rte. 6. Plans deposit $80 each for genera trades, $20 for food service equip. Reginald E. March 101 Park Ave., New York, Zone 17, archt. CD 3/21.

HEAVY CONSTRUCTION—LB & CA

▲ **H. L. Gentry Constr. Co.**, Eckel Rd., Perrysburg, O., CA Est. **$1,300,000**, constr. 40 mi. 24 in. gas pipe line between Oneida and Phoenix, NEW YORK. Niagara Mohawk Power Corp., 300 Erie Blvd. W., Syracuse, N. Y.

▲† **George M. Brewster & Son**, 275 Fort Lee Rd. Bogota, N. J., CA **$4,161,170**, apron and taxiwa support facilities Griffiss Air Force Base, ENG 30-075-58-209, ROME, N. Y. U. S. Eng., 111 E 16th St., New York 3, N. Y. Bids May 15. CD 5/1 under LB.

▲ **PENNSYLVANIA**—Pa. Hy. & Bridge Auth., 506 North Office Bldg., Harrisburg,

Middlecreek Constr. Co., Winfield, Pa., CA **$1,244,778**, est. $480,000, constr. 51,315 ft. crushed aggreg. base with bit. surf. variable in width. T.R. 16 Proj. 710-1, Greencaste and Mercersburg Boros, Montgomery, Peters and Antrim Twps., Franklin Co. Bids May 9, awarded June 6. CD 5/14, under LB.

BUILDINGS—LB & CA

Bellmore Lawns Homes, c/o Henry Klar Realty, 165 Hempstead Turnpike, West Hempstead, N. Y., Owner Builds, **$500,000**, 25 HOMES, South St. and Mark Ave., BELLMORE, N. Y.

▲ **Squirrel Hill Homes**, c/o N. M. Obedin Co., 124 Jackson St., Hempstead, N. Y., Owner Builds **$1,000,000**, 74 HOUSES, Fifth Ave. east of Larkfield Rd., EAST NORTHPORT, N. Y.

▲† **Metrig Corp.**, 2436 McDonald Ave., Brooklyn, N. Y., LB **$1,084,767** (6 bidders) 72 units Capehart HOUSING, ENG-30-075-58-297, FORT TOTTEN, N. Y. U. S. Eng., 111 E. 16 St., New York, Zone 3, N. Y. Bids June 5. CD 5/15.

▲ **Randall Park Estates**, c/o Lane Realty Co., 107-40 Queens Blvd., Forest Hills, N. Y., Owner Builds, **$2,000,000**, 125 HOUSES, South Ocean Ave., south of Merrick Rd., FREEPORT, N. Y.

Hartsdale Hills Homes, c/o Rubinstein & Pines, Worthington Rd., White Plains, N. Y., Owner Builds, **$400,000**, 15 HOUSES, Worthington Rd., HARTSDALE, N. Y.

Hartsdale Willows Homes, c/o Henry Moger, archt., 250 Main St., White Plains, N. Y.; Owner Builds, **$600,000,** 25 HOUSES, Keats and Hartsdale Aves., HARTSDALE, N. Y.

Pinewood Estates Homes, c/o Butterly & Green, 168-25 Hillside Ave., Jamaica, N. Y. Owner Builds. **$500,000,** 50 HOUSES, Sunrise Hy., ISLIP, N. Y.

Katonah Ridge Homes, c/o Curtis Hagen, Rte. 202, Peekskill, N. Y., Owner Builds, **$400,000,** 15 HOUSES, Goldens Bridge Rd., KATONAH, N. Y.

Monroe Hills Estates, c/o Leo Reinheimer, 30 Lake St., Monroe, N. Y., Owner Builds, **$400,000,** 40 HOUSES, School Rd., MONROE, N. Y.

▲ **Sunny Ridge Estates,** c/o Anthony S. Milewski, 39 S. Main St., Spring Valley, N. Y., Owner Builds, **$2,000,000,** 50 HOUSES, Rte. 304 (second section), NEW YORK, N. Y.

▲ **Island Hills Estates,** c/o Trylon Realty Co., 98-89 Queens Blvd., Forest Hills, N. Y., Onwer Builds, **$1,500,000** 150 HOUSES, Sunrise Hy. and Lakeland Ave., SAYVILLE, N. Y.

Holiday Park Homes, c/o Alwin Cassens Jr., archt., 145 S. Franklin Ave., Valley Stream, N. Y., Owner Builds, **$600,000,** 25 HOUSES, Center St. and Foch Blvd., SEARINGTON, N. Y.

Oak Side Estates Homes, c/o Curtis Hagen, Rte. 202, Peekskill, N. Y., Owner Builds, **$480,000,** 30 HOUSES, Rte. 132, YORKTOWN HEIGHTS, N. Y.

Clement Martin, Inc., 6230 Penn Ave., Pittsburgh 6, Pa. CA **$423,240,** 2 story, bsmnt., 1 story, 59 x 98 ft., 110 x 54 ft., 1 story, 25 x 85 ft. parochial SCHOOL, GLENSHAW, PA. St. Bonaventure Roman Cacholic Congregation Mt. Royal Blvd., Glenshaw, Pa. Bids Apr. 30. CD 4/22.

C. H. Martin Assocs., 18 First St., (Sharpsburg) Pittsburgh, Pa. CA **$648,000.** general constr. MEN'S DORMITORY and WOMEN'S DORMITORY BLDGS. for Indiana State Teachers College, INDIANA, PA. General State Auth., 18th and Herr Sts., Harrisburg, Pa. Bids May 21. CD 5/28, under LB.

Reisinger Bros. Inc., Box 516, Carlisle, Pa. LB **$511,000.** MEN'S DORMITORY and Utility expan. and constr. WOMEN'S DORMITORY for Shippensburg State College, SHIPPENSBURG, PA. General State Auth., 18th and Herr Sts., Harrisburg. Bids June 4. CD 4/29.

▲ **Mullan Contr. Corp.,** 3945 Greenmount Ave., Baltimore 18, Md., LB **$1,194,000** (5 bidders) brick, limestone, concrete, steel STUDENTS' RESIDENCE and DINING HALL, BALTIMORE, MD. College of Notre Dame, N. Charles and Homeland, Baltimore, Md. CD 9/30.

Hill & Kimmel, Inc., 8248 Georgia Ave., Silver Spring, Md., CA **$815,972** (5 bidders) remodeling building at 6410 Connecticut Ave. for Headquarters and Leadership TRAINING SCHOOL, CHEVY CHASE, MD. National 4-H Club Foundation, 8561 Fenton St., Silver Spring Md. Bids May 26. CD 6/4, under LB.

Frederick Constr. Co., Frederick, Md., LB **$827,064** (4 bidders) HOUSING (78 units) incl. ADMINISTRATION BLDG. and MAINTENANCE BLDG., FREDERICK, MD. Frederick Housing Auth., Frederick, Md. Bids June 4. CD 5/14.

▲† **W. M. Chappell,** 1346 Good Hope Rd. S.E., Wash., D. C., LB **$1,682,000** (8 bidders) service area facilities at U. S. SOLDIERS HOME, CIVENG-49-080-58-9, (18) WASH., D. C. U. S. Eng., 1st and Douglas Sts. N.W., Wash., D. C. Bids June 3. CD 5/8.

Victor R. Beachamp, Inc., 431 Cedar St., N. W., Wash., D. C., CA **$559,290,** 3 story, brick RELIGIOUS COMMUNITY RESIDENT BLDG., 650 Jackson St., N.E. WASH., D. C. The Province of the Immaculate Conception of the Third Order Regular of St. Francis in the U. S. of America, 1300 Newton St., N.E., Wash., D. C. Bids May 16. CD 5/22.

SOUTH

HEAVY CONSTRUCTION—BA

† **La., Shreveport**—BLAST DEFLECTORS—BA 6/26—U. S. Eng., P. O. Box 867, Little Rock, Ark., blast deflectors, incl. 39,360 sq. yd. 8 in. portland cement shoulder paving, surf., culverts and electric cable installation, Bossier Parish, ENG-03-050-58-54. $400,000.

† **Va., Oceana**—JET ENGINE MAINTENANCE SHOP—BA 6/26—Dist. P. Wks. Office, 5th Naval Dist., Room 307, Bldg. N-26, U. S. Naval Base, Norfolk, jet engine maintenance shop, Naval Air Station, NBy 15379, Spec. No. 15379/58. $500,000-$1,000,000. CD 9/23.

BUILDINGS—BA

▲† **Tenn., Murfreesboro**—ACTIVITIES, etc.—BA 7/22—Veterans Admin., Munitions Bldg., Wash., D. C., Special Activities Bldg. No. 107 and alterations to Bldgs. 1 and 2 at Veterans' Admin. NP hospital. $1,000,000-$1,500,000. Edwin A. Keeble Assoc., Inc., 2000 Glen Echo Rd., Nashville, archt. CD 5/7.

† **Fla., Bay Pines**—ADMINISTRATION CENTER IMPRVS.—BA 7/29—Veterans Admin., Munitions Bldg., Wash., D. C., alterations, addns. to Laundry Bldg. No. 13, at Veterans Admin. Center, $400,000-$500,000. Bail, Horton & Assocs., Fort Myers, archts. CD 5/2/58.

HEAVY CONSTRUCTION—LB & CA

▲ **VIRGINIA**—Dpt. Hys., Room 400, Central Hy. Office Bldg., 1221 E. Broad St., Richmond, Bids opened 6/4.

Va.—**W. H. Scott,** Box 418, Franklin, Va. LB **$78,899** (3 bidders) 3.258 mi. 16 ft. x 6 in. soil aggreg. base bit. surf. treatment beginning Int. Rte. 616 (N. of Somerton) ending Rte. 6583 (S. E. of Halland) Rte. 660. State Proj. 0660-061-016 Old State Proj. 1361-16 Fed. Proj. DS-1022 (1) Nansemond Co.;

Va.—**Sanford Constr. Co., Inc.,** P.O. Box 427, Sanford, N. C. LB **$1,486,423** (4 bidders) 1.12 mi. 2 laned 24 ft. x 8 in. rein.-c. conc. and 2 lanes 24 ft. x 5½ in. c. conc. and 3 bridges beginning E. Boundary line Ft. Eustis-Int. Rte. 168 and 0.635 mi. W. Int. Rte. 168, ending 0.237 mi. W. Int. Rte. 168. Rte. 105 State Proj. 0105 135070-071-072-073-075 Old State Proj. 1394-70-71-72-73-75 Fed. Proj. D-AD-A-AD-7 (2) City of Warwick.

Va.—**Turner Bros.,** P. O. Box 592, Salem, Va. LB **$169,144** (7 bidders) 1.472 mi. 22 ft. x 10 in. soil aggreg. base bit. surf. treatment beginning N. End Bridge over Judith Creek ending 1.472 mi. N. of N. End Bridge over Judith Creek, Rte. 501 State Proj. 0501-009-008-C Old State Proj. 2009-08, Fed. Proj. DS-643 (8) Bedford Co.;

Va.—**Howard-Lauier,** 3006 Decatur St., Richmond Va. LB **$160,320** (2 bidders) 0.08 mi. 6 in. b. conc. wid., bit. top, beginning 0.05 mi. N. Int. Rte. 60 ending SCL Richmond, Rte. 161 State Proj. 0161-020-005 Old State Proj. 2020-05 Fed. Proj. DS-DSG-865 (2) Chesterfield Co.; and 0.34 mi. 2 lanes 34 ft. x 6 in. c. conc. beginning 0.34 mi. N. SCL Richmond ending SCL Richmond, Rte. 161 State Proj. 0161-127-070 Old State Proj. 2020 70 Fed. Proj. US 127-2, City of Richmond;

Va.—**Clyde R. Royals,** 350 W. Pembroke Ave., Hampton, Va. LB **$189,026** (3 bidders) 1.62 mi. 22 ft. 56 ft. x 5½ in. c. conc. beginning 0.61 mi. N. Int. Rte. 602 ending 0.2 mi. W. Int. Rte. 658 Rte. 60 State Proj. 0060-047-005-C-1 Old State Proj. 2147-05 Fed. Proj. DS-1013 (4) James City Co.;

Va.—**E. G. Bowles & G. P. Clay,** 1506 Webster St., Richmond, Va. LB **$619,795** (2 bidders) 1.46 mi. 64 ft. x 6 in. c. conc. beginning 1.42 mi. W. 1914 Corp. line ending 0.03 mi. E. 1914 Rte. 6 State Proj. 0006-127-070 Old State Proj. 3143-70 Fed. Proj. US 127-2 (1) City of Richmond;

Va.—**D. W. Winkleman Carolina Co., Inc.,** Box 2566 Greensboro, N. C. LB **$232,593** (5 bidders) 4.74 mi. 20 ft. x 8 in. soil cement (alt. soil aggreg.) beginning 0.48 mi. N. of Goodell's Creek ending 5.11 mi. S. WCL Chase City Rte. 49 State Proj. 0049-058-013-008-C Old State Proj. 3458-13-08 Fed. Proj. DS-693 (6) Mecklenburg Co.;

Va.—**L. S. Abernathy & Co.,** Rte. 4, Glen Allen, Va. LB **$100,961** (8 bidders) 2.04 mi. 22 ft. x 8 in. soil aggreg. base bit. surf. treatment beginning 0.01 mi. E. Old Rte. 360 (Central Garage) ending 0.49 mi. N. Int. Rte. 611 Rte. 30 State Proj. 0030-050-009 Old State Proj. 4350-09, Fed. Proj. DS-101 (9) C, King William Co. CD 5/20.

▲ **NORTH CAROLINA**—State Hy. Dpt., Raleigh, Bids opened 6/3,

N. C.—**W. E. Graham & Sons,** Cleveland, N. C., LB **$96,110,** est. $100,000-$125,000, structures, NC 197 from point on US 19 and 23 approx. 5 mi. north of Weaverville east across country or near existing road to point approx. 26 mi. southwest of Burnsville, Proj. S-46(3) Buncombe Co.; LB **$664,903,** est. over $500,000, structures, relocation US 421 from point 1125 ft. east of Yadkin River Bridge east to a point approx. 2 mi. west of Winston-Salem, Forsyth Co. Proj. F-172 (4); LB **$1,219,918** est. exceeds $500,000, structures relocation of US 70 from point approx. 1 mi. west of Old Fort, east across country to point approx. 0.9 mi. east of US 221, McDowell Co. Proj. 1-40 2 (16) 72,

N. C.—**Hickory Constr. Co., Inc.,** Hickory, N. C., LB **$82,882,** est. $75,000-$100,000; structures, US 19-E from point west of Crabtree Creek, east to point 1.5 mi. west of Spruce Pine, Proj. F096-3 F-94 (5), Mitchell and Yansey Counties,

N. C. **W. F. Brinkley & Sons,** Box 595, Cleveland, N. C., LB **$126,976,** est. $125,000-$150,000. replacing 3 bridges U. S. 701, 8.82436, DF-287 (5) Johnston Co.;

N. C.—**Bowers Constr. Co.,** Box 1706, Raleigh, N. C., LB **$265,606,** est. $225,000-$250,000. bridge, approaches 0.227 mi. over Cape Fear River on U. S. Rte. 401, 8.84369, DF-208 (17), Harnett Co. CD 5/23.

▲ **NORTH CAROLINA**—State Hy. Comn., Raleigh. Bids opened 6/3,

N. C.—**Dickerson, Inc.,** Monroe, N. C., LB **$256,149,** est. $250,000-$300,000, 10.64 bit. concrete binder and surface and shoulders, U. S. 29-29A and 601, resurfacing US 29 between Concord and Rowan Co. Line, streets and parts of US 29-A and 601 in Kannapolis and Concord, Proj. 8.86145, DF-198 (7) DF-492 (8) BS 7.662069, Code 9.81004, Cabarrus Co.; LB **$319,869,** est. $300,000-$400,000 10.615 mi. NC 49, bit. concrete binder and surface and shoulders, resurfacing N. C. 49 from point approx. 7 mi. north of Charlotte, northeast to point in N. C. 49 near Jackson Training School, street in Mt. Pleasant connecting N. C. 73 and N. C. 49, Proj. 8.86177 DF 145 (8) DF 144 (2) Code 9.81017 Cabarrus and Macklenburg Counties; LB **$297,803,** est. $300,000-$400,000 17.35 mi. N. C. 27 and 200, bit. concrete binder and surface, resurfacing N. C. 27 from West City limit of Albermarle southwest to East end of First Curve West of Rocky River Bridge in Cabarrus Co., N. C. 200 North from N. C. 27, 0.25 mi. Proj. 8.16862, Code 9.81010, Stanley and Cabarrus Counties;

N. C.—**Nello L. Teer Co.,** 4020 Roxboro Rd., Durham, N. C., LB **$1,623,838,** est. exceeds $500,000, 14.55 mi., fine, grading, STBS, BST and bit. con. base and surface, surfacing on relocation of US 301 from point near Eastover, Northeast to Harnett Co. Line, Proj. 8.13438 1095-2 (10) 55, Cumberland Co.; LB **$251,683,** est. $225,000-$250,000, 2.97 mi. fine grading, CABC and BST, surfacing on Chapel Hill By-pass, from point on N. C. approx. 1 mi. west of Carrboro, southeast to point on US 15 and 501 south of Chapel Hill, Proj. 8.14613 S 891 (2) Orange Co., LB **$91,635,** est. $125,000-$150,000, 1.84 mi. grading, CABC and S. A. Base and surface, from point on US 264 just northeast of North City limits of Washington, Northwest along or near Washington Ave. and 15th St. to US 17, Proj. BS 6.152901 BS 6.152901 Code 9.80248, Beaufort Co.;

N. C.—**F. D. Cline Paving Co.,** Murchin Rd., Fayetteville, N. C., LB **$136,159,** est. $100,000-$125,000, 16.55 mi. US 401 NC 24 and 53, bit. conc. resurfacing US 401 NC 24 and 53 in and near Fayetteville, Proj. BS 7.441172 Code 9.80620 Cumberland Co.;

N. C.—**Wright Constr. Co.,** Box 1537, Columbus, Ga., LB **$882,317,** est. exceeds $500,000, 15.48 concrete pavement resurfacing and shoulders US 29 from end of divided pavement approx. 2 mi. north of Charlotte, northeast to point north of southern railway overpass just north of NC 73, Proj. 8.86144 DF 591 (10) Macklenburg and Cabarrus Counties;

N. C.—**Blankenship Bros.,** Box 3686, Charlotte, N. C., LB **$555,304,** est. $400,000-$500,000, 5 mi. fine grading, SABC and bit. concrete binder and surface and shoulder construction, surfacing on relocation of NC 27 at Albermarle (Albermarle by-pass) Proj. 8.16863, F-592 (3) BS 6.681153, Stanly Co.;

N. C.—**J. C. Critcher, Inc.,** Box 39, Asheville, N. C., LB **$523,264,** est. $500,000, 6.43 mi. grading, CABC, BST NC 197 from point on US 19 and 23 approx. 5 mi. north of Weaverville, east across country, of near existing road to point approx. 26 mi. southwest of Burnsville Proj. 8.19045, Buncombe Co.;

N. C.—**L. A. Reynolds Co., Inc.,** 1100 West 1st St., Winston-Salem, N. C., LB **$783,893,** est. over $500,000, 10.075 mi. grading, relocation US 421 from point 1125 ft. east of Yadkin River Bridge, east to point approx. 2 mi. west of Winston-Salem Counties, Proj. 8.17392, Forsyth Co.;

N. C.—**Asheville Contr. Co.,** Box 5119, Asheville, N. C., LB **$382,302,** est. $400,000-$500,000, 3.63 mi. grading, CABS BST US 19-E from point West of Crabtree Creek, east to point 1.5 mi. West of Spruce Pine, Proj. 8.18553, Mitchell and Yansey Counties;

N. C.—**Mount Airy Grading Co.,** Mt. Airy, N. C., LB **$2,179,527,** est. exceeds $500,000, 14.07 mi. grading, relocation of US 70 from point approx. 1 mi. West of Old Fort, east across country to point approx. 0.9 mi. east of US 221, Proj. 8.18523, McDowell Co.;

N. C.—**Bowers Constr. Co.,** Box 1706, Raleigh, N. C., LB **$2,148,821,** CABC, b. conc. binder, and surface c. conc. and structures, 1.86 mi. US 70-19 and 23, U-661 (6) Buncombe Co. CD 5/23.

ALABAMA—State Hy. Dpt., Montgomery, Bids opened 5/30,

Ala.—**Glencoe Paving Co., Inc.,** Glencoe, Ala., LB **$377,831,** second stage bit. pavement 10.626 mi. from Guin toward Hamilton, Marion Co.; LB **$367,089,** second stage bit. pavement 19.117 mi. from Moulton to Decatur, Lawrence and Morgan Counties; LB **$231,908,** second stage bit. pavement 9.369 mi. Nauvoo-Natural Bridge road, Walker and Winston Counties;

Ala.—**Burgreen Constr. Co.,** Athens, Ala., LB **$229,753,** bit. pavement 2.58 mi. part of Decatur-Courtland road, Lawrence Co.;

Ala.—**Sam Finley, Inc.,** 292 North Ave. N.W., Atlanta, Ga., LB **$269,155,** second stage bit. pavement 8.954 mi. U.S. 31 from Hartselle to Decatur, Morgan Co.;

Ala.—**W. S. Fowler Rental Equipment Co., Inc.,** Oneonta, Ala., LB **$511,456,** grading, draining 8.073 mi. from U.S. 72 east of Larkinsville, north to Skyline, Jackson Co.;

Ala.—**J. W. Gwin, Jr., Inc.,** Comer Bldg., Birmingham, Ala., LB **$278,527,** base and bit. 7.704 mi. from Ala. 5 on Marion bypass north to Ala. 5, Perry Co.;

Ala.—**Clyde O. Mitchell,** 104 N. 44 St., Birmingham, Ala., LB **$531,903,** relocation with climbing lanes 9.541 mi. U.S. 78 from Jaspeer west toward Winfield, Walker Co. CD 5/20.

Brown & Root, Inc., Box 3, Houston, Tex., CA **$550,000,** 22 mi. 16 in. crude line-offshore area, Cameron, LOUISIANNA. Magnolia Petroleum Co., 1210 Main, Houston, Tex. CD 9/9/54.

▲† **Massman Constr. Co.,** 3917 Broadway, Kansas City, Mo., CA **$15,416,055,** est. $17,778,509, constr. dam on Ohio River for Greenup Locks and Dam at Greenup, CIVENG-46-022-58-45, KENTUCKY. U. S. Eng., P.O. Box 2127, Huntington 18, W. Va. Bids May 21. CD 5/28.

BUILDINGS—LB & CA

† **Security Constr. Co.,** 702 W. Drive, Circle, Richmond 26, Va. LB **$652,700** (2 bidders) Capehart family HOUSING Special AAA installations, Norfolk Defense Area, ENG-44-110-58-41, NORFOLK, VA. U. S. Eng., foot of Front St., Norfolk 1, Va. Bids May 22. CD 4/30.

▲ **Girdler Constr. Div. Chemetron Corp.,** 224 E. Broadway, Louisville, Ky., CA Est. **$1,000,000,** expansion of SYNTHETIC RUBBER PRODUCTION FACILITIES, INSTITUTE, W. VA., Goodrich-Gulf Chemicals, Inc., 3121 Euclid Ave., Cleveland 15, O., CD 3/4/57.

† **Potts-Brown Co., Inc.,** 404½ S. Tryon, Charlotte, N. C., LB **$499,500,** OFF-SITE FACILITIES for Capehart Housing, incl. water feeder lines, sewage pumping stations, and force mains, elec. power lines, roadway, bridge widening, Marine Corps Air Station, NBy 10760, CHERRY POINT, N. C. Dist. P. Wks. Office, Fifth Naval Dist., Bldg. N-26, Norfolk, Va. Bids June 3, CD 5/15, under Airports.

▲† **Daniel Constr. of Alabama,** 822 7 Ave., S., Birmingham, Ala. LB **$4,891,000.** Base bid, constr. 316 units CAPEHART HOUSING at Redstone Arsenal No. 2, HUNTSVILLE, ALA. U. S. Eng., 2301 Grant St., Huntsville, Ala. Bids June 5. CD 5/20.

▲ **McDermott Fabricators (Div. J. Ray McDermott),** Harvey, La., CA, furnishing, erecting steel for SULPHUR MINING PLANT, Grand Isle, in Gulf of Mexico, LOUISIANA. Freeport Sulphur Co., 16 E. 42nd St., New York, N. Y. Total est. $30,000,000.

Livingston Shipbuilding Co., Orange, Tex., CA foundations for living quarters, structures and Power Plant (Louisiana);

Metal Building Products Co., Inc., 1937 Lafayette St., New Orleans, La., CA living Quarters Bldg. (Louisiana).

MIDDLE WEST

BUILDINGS—BA

▲ **Mich., Chesaning**—SCHOOL—BA 6/25—Bd. Educ., Chesaning Union Schools, Vera G. Rice, secy., high school, M-47. $1,500,000. Louis C. Kingscott & Assoc., Inc., 511 Monroe, Kalamazoo, archt CD 1/3.

▲ **Ill., Chicago**—HOUSING—BA 7/1—Chicago Housing Auth., 608 S. Dearborn St., Zone 5, one 13 story, 140-dwelling unit, housing, corner Campbell and Monroe Sts., $1,500,000. Nicol & Nicol, 23 E. Jackson Blvd., Zone 4, archts.

HEAVY CONSTRUCTION—LB & CA

P & C Constr. Co., 2001 E. Pontiac St., Fort Wayne, Ind., LB **$422,233** (3 bidders), sewage treatment plant, KENDALLVILLE, IND., Village, Village Hall, Kendallville, Ind., Bids May 27, CD 4/30.

▲† **S. J. Groves & Sons Co.**, 500 Wesley Temple, Minneapolis, Minn., LB **$13,600,000**, constr. runway and taxiway at Richard I. Bong Air Force Base, ENG-11-032-58-6, KANSASVILLE, WIS., U. S. Eng., 475 Merchandise Mart, Chicago 54, Ill., Bids June 5, CD 4/17.

BUILDINGS—LB & CA

Hamaann Constr. Co., 36931 Euclid Ave., Willoughby, O., CA Est. **$400,000**, TEMPLE, 5500 Mayfield Rd., LYNDHURST, O. Woodward Masonic Temple, John Amor, Master, 1949 E. 105 St., Cleveland 6, O. CD 9/6/56.

Berling & Sons, 212 S. Temple St., Indianapolis, Ind., CA **$467,300**, general contract, Consolidated HIGH SCHOOL, incl. 16 classrooms, and 1,800-seat gymnasium, MOORESVILLE, IND. Bd. Educ., Mooresville, Ind. Awarded May 24, CD 1/24.

Baker & Shindler, Defiance, O., CA **$622,000**, (6 bidders), general contract HIGH SCHOOL, at U. S. 24 and Woodburn Rd., near WOODBURN, IND. Bd. Educ., Maumee-Milan School Dist., Woodburn, Ind. Bids May 27, awarded June 2, CD 5/1.

E. C. Knuth & Co., 2919 W. Fond du Lac Ave., Milwaukee, Wis., CA **$547,880**, (7 bidders), general contract, HIGH SCHOOL addn., WEST MILWAUKEE, WIS. School Dist. No. 1, West Milwaukee, Wis., Bids June 2. CD 5/22.

Proksch Constr. Co., Iron River, Mich., CA **$629,855** MARRIED STUDENTS APARTMENTS (6 bldgs.) Northern Michigan College of Education, MARQUETTE, MICH. State, Bd. Educ., Lynn M. Bartlett, secy., Capitol Bldg., Lansing, Mich. Bids Apr. 30. CD 4/10.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

▲ **Colo., Colorado Springs**—BA 6/25—City, City Hall, 1,000 ft. and earth filled type dam 180 ft. high across North Catamount Creek. $2,000,000. Black & Veatch, 1500 Meadow Lake Parkway, Kansas City, Mo., engrs.-archts.

▲† **Wyo., Cheyenne**—MISSILE LAUNCHING FACILITIES—BA 7/8—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., constr. missile launching facilities and utilities Squadron One, Warren Air Force Base, ENG-25-066-58-154. $13,000,000-$16,000,000. CD 1/6.

BUILDINGS—BA

Mo., Jennings (St. Louis 21 P. O.)—SCHOOLS—BA 6/24—Jennings School Dist., Bd. Educ., Arthur E. Wehmeier, supt. Schools, 8837 Cozzens Ave., Zone 21, addns. to Jennings Junior High School, 8831 Cozzens Ave., addns. Jennings Senior High School, 2300 Shannon Ave. $485,000. P. Hoener & Assocs., 4227 Watson Rd., St. Louis 9, Mo., archts. CD 2/27.

▲ **Colo., Aurora**—SCHOOLS—BA 6/25—School Dist. No. 28-J, 11th and Peoria Sts., 1 story, 31,390 sq. ft. school, 5th and Lansing; 1 story, 25,692 sq. ft. Morris Heights School, $1,112,000, Achison & Kloverstrom, 257 Josephine, Denver, archts.-engrs. CD 10/17.

Minn., St. Paul—FOOD SERVICE BLDG., etc.—BA 6/26—Regents of the University of Minnesota, C. A. Smith, purch. agt., 404 Administration Bldg., Minneapolis 14, food service bldg., dining facilities on Campus. $525,000. Magney, Tusler & Setter, 303 Roanoke Bldg., Minneapolis, archts. CD 3/21, under LB.

▲ **Neb., Omaha**—SCHOOL—BA 6/26—Bd. Educ., 39th and Davenport, Zone 31, Westside High School addn. $1,150,000 CD 4/10.

▲† **Tex., El Paso**—BUILDINGS—BA 6/26—U. S. Eng., Box 1538, Albuquerque, N. M., 23 masonry blgs. 11 prefab blgs. 55,000 sq. yd. hot mix paving 440,000 sq. yd. single but tr. utility lines, etc. Fort Fliss, ENG-29-005-58-140. $1,000,000-$1,750,000. CD 9/18.

▲† **South Dakota**—ADMINISTRATION, etc.—BA 7/15—U. S. Eng., 1709 Jackson St., Omaha, Neb. constr. admn. bldg., kitchen, dining bldg. and 2 dormitories Cheyenne River Indian Agency, relocation Oahe Reservoir Proj. $1,500,000-$2,000,000. CD 9/5, under earthwork, etc.

HEAVY CONSTRUCTION—LB & CA

▲ **MINNESOTA**—State Hy. Dpt., 1246 University Ave., St. Paul,

Minn.—**E. W. Coons Co.**, Box 239, Hibbing, Minn., CA **$1,076,687**, concrete paving and plant-mixed bit.

(Continued on page 198)

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(Continued from page 195)

surf. 18.7 mi. in and near Mora and near Mission Creek Kanabec and Pine Counties;

Minn.—**Okes Co., Inc.**, E. 1501 First Natl. Bank Bldg., St. Paul, Minn., CA **$971,357**, grade, concrete paving, shouldering and bridge 9.9 mi. between jct. TH 55 west of Tenney and Doran, Wilkin Co. Bids May 23. CD 5/29, under LB.

▲† **Mary-Badgett**, composed of **Mary Constr. Co.**, P.O. Box 423, Cape Girardeau, Mo. and **Badgett Strip Mining Co.**, Box 191, Madisonville, Ky. (joint venture), CA **$6,110,601**, est. $5,761,158, completion of Pomme de Terre Dam and Reservoir, Missouri River, near Hermitage, ENG-23-028-58-104, MISSOURI. U.S. Eng., 1800 Federal Office Bldg., 911 Walnut, Kansas City 6, Mo. Bids May 20 CD 5/23, under LB.

† **Cook Constr. Co.**, 1740 Vine St., Lincoln, Neb. LB **$856,000** (8 bidders) elementary school (General Arnold) Lincoln Air Force Base, LINCOLN, NEB. U. S. Eng., 1709 Jackson St., Omaha, Neb. CD 8/23/56.

▲† **Acme Constr. Co.**, 6000 N.W. 39 St., Oklahoma City, Okla., LB **$1,281,489**, est. $1,400,635 (6 bidders) Air national guard bldg., Will Rogers Airport, ENG-34-066-58-68, OKLAHOMA CITY, OKLA. U.S. Eng., P.O. Box 61, Tulsa 2, Okla. Bids June 4. CD 5/13.

M. A. Swatek & Co., 1137 NW 2nd St., Oklahoma City, Okla., CA **$563,732**, est. $625,000, detour road and bridge over Boggy Creek on Atoka Reservoir Project, Atoka, OKLAHOMA CITY, OKLA. City, City Hall, Oklahoma City, Okla. Bids June 3. CD 5/29.

▲ **Sharman, Allen, Gay & Taylor**, c/o Bayou Bldg., Houston, Tex. CA **$1,560,000**, 39 mi. 24 and 30 in. crude line between Port Arthur and Hankamer, Tex. (Chamers Co.) TEXAS. Humble Oil & Refining Co., 1210 Main St., Houston, Tex. CD 3/12.

▲ **Lembke Constr. Co.**, Box 771, Colorado Springs, Colo., CA **$1,014,261**, municipal WW imprvs. 20 m.g. filtered water storage reservoir, COLORADO SPRINGS, COLO. City, City Hall, Colorado Springs, Colo. Bids May 14. CD 5/20, under LB.

† **L. R. Foy Constr. Co., Inc.**, 234 W. 4 St., Hutchinson, Kan., CA **$563,437**, armament test shop assembly, Holloman Air Force Base, ENG-29-005-58-89, ALAMOGORDO, N. M. U. S. Eng., Box 1538, Albuquerque, N. M., Bids May 23, CD 3/8.

BUILDINGS—LB & CA

Walco, Inc., 509 Second Ave. South, Minneapolis, Minn., LB **$792,800** (6 bidders), HIGH SCHOOL and RESIDENCE at site near White Bear and Larpenteur Aves., MAPLEWOOD (P.O. St. Paul), MINN. Archdiocese of St. Paul, W. O. Brady, Archbishop, 244 Dayton Ave., St. Paul, Minn. Bids June 3. CD 5/14.

McGough Constr. Co., 1172 Selby Ave., St. Paul, Minn., CA **$865,000** (7 bidders), general contract 3 story, ground floor LIBRARY, at College, ST. PAUL, MINN. St. Thomas College, Very Rev. J. P. Shannon, pres., 2115 Summit Ave., St. Paul, Minn. Bids May 20. CD 5/1.

Abell-Howe Co., 1114 Shaver Rd., N.E., Cedar Rapids, Iowa, CA Est. **$750,000**, 71 unit MOTOR HOTEL, consisting of restaurant, 2 meeting rooms, air-conditioning, off-street parking, etc., 4519 First Ave. S.E., CEDAR RAPIDS, IOWA, Dillon Hotels Co., 2763 Wyoming St., Omaha, Neb.

▲ **Lehr Constr. Co.**, 2115 Frederick, St. Joseph, Mo., LB **$4,395,619**, est. $1,000,000, 6 story, bsmnt., subbsmnt. HOSPITAL, ST. JOSEPH, MO. St. Joseph Hospital c/o Sister Marguerite, hosp. admin., 9th and Powell Sts., St. Joseph, Mo. Bids June 2. CD 5/28.

W. D. Anderson Co., Box 9152, Allandale Station, Austin, Tex. CA **$433,331**, 15 CLASSROOMS, etc. BROWNSVILLE, TEX. Franco American Educational Society, c/o Br. Wm. Vessels, supt., St. Joseph's Academy, Brownsville, Tex. Bids May 15. CD 6/2, under LB.

Centex Constr. Co., 4606 Greenville, Dallas, Tex. Owner Builds. **$572,000**, 44 DWELLINGS in Country Club Subdivision, DALLAS, TEX. CD 6/2.

Jansan Constr. Co., 1202 Powhattan, Dallas, Tex. CA **$596,024** CLUBHOUSE, DALLAS, TEX. Northwood Club, c/o Jack Corgan, 308 Tower Pet. Bldg., Dallas, Tex. Jack Corgan, 308 Tower Pet. Bldg., Dallas, Tex., archt. Wm. K. Hall Co., Exch. Bank Bldg., Dallas, Tex. engr. Bids May 20. CD 12/17.

Centennial Constr. Co., 109 Dover Dr., Dallas, Tex. Owner Builds. **$445,500** 33 DWELLINGS, FARMERS BRANCH, TEX. CD 6/2.

Harris Hospital, c/o W. P. Earngey Jr., admn., 1300 W. Cannon St., Fort Worth, Tex. rejected bids May 13, AUXILIARY BLDG. and POWER PLANT across street from hospital, on Puritt St., FORT WORTH, TEX. **$746,634**. Will re-advertise. (**Correction**—status). CD 6/2, under CA.

Centennial Constr. Co., 109 Dover Dr., Dallas, Tex. Owner Builds. **$490,000**, 35 DWELLINGS, GARLAND, TEX. CD 6/2.

▲† **Brown & Root, Inc.**, 4100 Clinton Dr., Houston, Tex. LB **$2,987,705**, Base Bid POLYSULFIDE PROPELLANT FACILITIES, Longhorn Ordnance Works, ENG-03-050-58-49, MARSHALL, TEX. U.S. Eng., P.O. Box 867, Little Rock, Ark. CD 6/4 under LB.

Tellepsen Constr. Co., Box 2536, Houston, Tex. CA **$845,000**. 6 story, bsmnt., BANK OFFICE, VICTORIA, TEX. Victoria National Bank, Victoria, Tex. Bids Mar. 21. (**Correction**—contractor). CD 4/2, under CA.

▲ **Refinery Engineering**, 108 N. Trenton, Tulsa, Okla. CA Est. **$2,400,000**. 2nd phase, 2,300 b/d hydrofluoric acid alkylation unit at 34,000 b/d REFINERY, BILLINGS, MONT. Carter Oil Co., 2813 3 Ave. N., Billings, Mont.

FAR WEST

HEAVY CONSTRUCTION—BA

Wash., **Arlington**—BA 7/1—Town, Town Hall, treatment plant, lift stations and 75,000 ft. 6- to 30-in. storm and sanitary sewers, $450,000. Plans deposit $25, Gray & Osborne, 228 S. 2 St., Yakima, engrs. CD 9/24.

BUILDINGS—BA

▲ **Calif., Long Beach**—FACULTY OFFICE, etc.—BA 7/2—State Div. Architecture, 1100 S. Grand Ave., Los Angeles, 3 story, partial bsmnt. about 97,000 sq. ft. faculty office bldg. and 3 story classroom bldg. with connecting passageways at Long Beach State College. W. O. 4005GC-10. $1,426,000. Plans deposit $100. CD 7/24.

BUILDINGS—SLC

Utah, Salt Lake City—APARTMENT—Wasatch Towers, c/o Bruce J. McDermott, archt., Suite 12, 1400 Foothill Dr., soon lets contract, 8 story all steel apartment $700,000. CD 5/14, under Tracy Collins Trust Co., 151 S. Main St., as owner.

HEAVY CONSTRUCTION—LB & CA

▲ **Northwood, Inc.**, 4232 S. E. Cora St., Portland Ore., CA **$1,131,614**, 36,000 ft. interceptor sewers, Contrs. 1 and 2, ABERDEEN, WASH., City, City Hall, Aberdeen, Wash. Bids May 7. CD 5/15, under LB;
H. Kaeser Co., 3629 34 Ave. S., Seattle, Wash., CA **$517,778**, 20,047 ft. concrete, asbestos-cement interceptor sewers, Contr. 3, (Aberdeen, Wash.), CD 5/20, under LB.

† **OREGON**—Bureau P. Rds., Morgan Bldg., Portland,
Funderburk Constr. Co., Sutherlin, Ore., CA **$688,529**, est. $902,355, grading 18.714 mi. Camp Creek Rd., constr. 170 ft. concrete bridge, Douglas Co. Bids May 23. CD 6/3.

▲ **OREGON**—Oregon Hy. Comn., Highway Bldg., Salem, Bids opened 5/29,
Ore.—**Morrison-Knudsen Co.**, Hoge Bldg., Seattle, Wash., LB **$2,544,395** (7 bidders), 3.21 mi. grading, Hooskanaden Creek-Thomas Creek section of Oregon Coast Hy., FAP BF 124(14), Curry Co.;
Ore.—**C. C. Meisal**, McMinnville, Ore., LB **$224,558**, (7 bidders) grading and oiling, 5.89 mi., Kimberly-Long Creek Hy., FAP DS-260 (5) Grant Co.;
Ore.—**Durbin Bros.**, Eugene, Ore., LB **$206,345** (3 bidders, grading, paving, structure, 0.77 mi. Trail Creek Bridge section of Crate Lake Hy., FAP S-47(7) Jackson Co.;
Ore.—**M. C. Lininger & Sons**, Medford, Ore., LB **$107,125** (4 bidders) grading and paving, 1.11 mi., FAP DU-190 (19), Ashland, Jackson Co.;
Ore.—**Tuss Bros. & Loyal A. Warner**, Woodburn, Ore., LB **$246,990**, (7 bidders) grading and paving, 3.28 mi. on Willamette Hy., FAP DF-184(4) Klamath Co.;
Ore.—**T. C. Wildish**, Eugene, Ore., LB **$171,555** (6 bidders) 2.9 mi. paving, Junction City—Eugene Hy. FAP DS 373(1), Lane Co.;
Ore.—**Central Paving Co.**, Independence, Ore., LB **$441,916** (7 bidders), grading and paving, 8.19 mi. 3 concrete structures, Central Oregon Hy., FAP F-326 (4) Malheur Co.; LB **$96,992** (3 bidders) .95 mi. grading and paving, reconstruct 1 bridge, FAP DBS 265-(5) Salem, Marion Co.;
Ore.—**C. R. O'Neil**, Creswell, Ore., LB **$710,112**, (8 bidders) grading 9.78 mi. North Santiam Hy: FAP S-220 (12) and S-265 (6) Marion Co.;
Ore.—**Warren Northwest Co.**, 9860 N. E. Hancock Dr., Portland, Ore., LB **$865,439** (10 bidders) grading and paving, 1.34 mi. three structures, Cascade Hy., FAP S-364 (3) and US 364 (2) Portland, Multnomah Co.

▲† **R. A. Heintz Constr. Co.**, 211 NE Columbia Blvd., Portland, Ore., LB **$2,635,493**, est. $3,006,144, Spec. DC 5044, enlargement of Emigrant Dam, Rouge River Project, Ashland, OREGON. Bureau Reclamation, Dpt. Interior, P. O. Box 386, Camp White, Ore. Bids June 3. CD 4/29.

▲ **CALIFORNIA**—State Div. Hys., 1120 N. St., Sacramento, Bids opened 6/4,
Norman I. Fadel, Inc., 7101 Radford St., North Hollywood, Calif. LB **$1,079,420** grading, surf. to complete 3.2 mi. 4-lane divided hy. Redwood Hy. between Fortuna and 0.8 mi. north of Fernbridge, 1-Hum-1-Fta; G; Humboldt Co. CD 5/8.

CALIFORNIA—State Div. Hys., 1120 N. St., Sacramento,
Mercer, Fraser Co., Inc., and **Mercer, Fraser Gas Co., Inc.**, 2nd and Commercial Sts., Eureka, Calif. CA **$529,955** grading, surf. to provide 1 way street couplet through Crescent City and to widen U.S. Hy. 101 at North and South approaches to city between 0.6 mi. south of Elk Valley Rd. and 0.4 mi. north of Northcrest Dr. I-DN-1B, CRC C. Del Norte Co. Bids May 14, awarded June 2. CD 5/28, under LB.

▲† **Baldwin Contg. Co., Inc.**, P. O. Box 311, Marysville, Calif. CA **$1,814,000** 91,000 sq. ft. floor space with utilities composite structure Spec. 2421, ENG-04-167-58-49, BEALE AIR FORCE BASE, CALIF. U. S. Eng., 1209 8th St., Sacramento, Calif. Bids May 28. CD 6/2, under LB.

Stockton Constr. Co., Box 2087, Stockton, Calif. LB **$560,000** storm drainage imprvs. (storm) drains, manholes, sewers etc.) Oak Grove Ave., BURLINGAME, CALIF. City, c/o City Clerk, City Hall, Burlingame, Calif. CD 1/16.

† **P. J. Walker Co.**, 3900 Whiteside Ave., Los Angeles, Calif. CA **$525,235** guidance station, Cooke Air Force Base, ENG-04-353-58-87, LOMPOC, CALIF. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids May 28. CD 6/4, under LB.

† **Manderbach Constr. Co.**, 1837 Victory Blvd., Glendale, Calif. LB **$960,103** (5 bidders) officers quarters (men) Edwards Air Force Base, ENG-04-353-58-73, MUROC, CALIF. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids May 29. CD 4/25.

† **Pacific Bridge Co.**, foot of Sherman St., Alameda, Calif. LB **$424,362** est. $386,892 (2 bidders) 3 story 200 men capacity airmens dormitory at McClellan Air Force Base, Spec. No. 2441, ENG-04-167-58-50, SACRAMENTO, CALIF. U. S. Eng., 1209 8th St., Sacramento, Calif. Bids June 3. CD 5/12.

BUILDINGS—LB & CA

▲† **J. Stewart Co.**, 411 N. Central Ave., Phoenix, Ariz., CA **$1,385,000**, 1 story LABORATORY AND SERVICE BLDG., PUMP HOUSE, STORAGE BLDG., FIRE HOUSE, waste disposal facilities, etc., to serve Experimental Breeder Reactor II project at National Reactor Testing Station, Inv. AT(10-1)-938, ARCO, IDAHO, Atomic Energy Comn., Idaho Operations Office, Idaho Falls, Idaho, Bids May 28, CD 6/4, under LB.

▲† **Sheriden, Inc.**, 236 N. Lake St., Pasadena, Calif., LB **$3,989,000**, 270 unit Capehart HOUSING, Mountain Home Air Force Base, MOUNTAIN HOME, IDAHO. Procurement Officer, Mountain Home Air Force Base, Idaho, Bids June 5, CD 5/16.

† **Murphy Bros., Inc.**, E. 3728 Broadway, Spokane, Wash. LB **$243,494** (9 bidders) constr. OFF-SITE UTILITIES for 250 units of family housing, Fairchild Air Force Base; Inv. 58-113, SPOKANE, WASH. Procurement Office, Fairchild Air Force Base, Wash. Bids May 26. CD 12/4.

▲ **Robertson, Hay & Wallace**, 1801 S. E. Grand Ave., Portland, Ore., LB **$1,237,000**. men's DORMITORY and DINING HALL, PORTLAND, ORE. University of Portland, 4730 N. Willamette Blvd., Portland, Ore. Bids June 4. CD 5/19.

▲† **Hal B. Hayes & Assocs.**, 1235 Sierra Altos Way, Los Angeles, Calif. LB **$9,078,500**, 570 Capehart Family HOUSING units, BEALE AIR FORCE BASE, CALIF. Base Procurement Office, Beale Air Force Base, Calif. Bids June 3. CD 5/6.

▲ **Harris Constr. Co.**, P. O. Box 109, Fresno, Calif. LB **$1,148,000** (7 bidders) Kings Canyon JUNIOR HIGH SCHOOL, Tulare and Helm Ave. (11 separate bldg.) FRESNO, CALIF. Fresno City Unif. School Dist., c/o Supt., 2348 Mariposa, Fresno, Calif. Bids May 29. CD 4/29.

▲ **William A. Greschner Co.**, 1108 E. Washington St., Santa Ana, Calif. LB **$2,905,852** (7 bidders) constr. Westminster HIGH SCHOOL, HUNTINGTON BEACH, CALIF. Huntington Beach Union High School Dist., 1905 Main St., Huntington Beach, Calif. Bids June 4. CD 5/7.

H. H. Johnson Constr. Co., 856 G St., Chula Vista, Calif. CA **$434,770**, 37 stucco DWELLINGS, Lake Murray Village Tract No. 3, LA MESA, CALIF. Johnson, Tyson & Lynds, 856 G St., Chula Vista, Calif.

Riha Constr. Co., 8150 Center St., La Mesa, Calif. CA **$409,260** stucco GUEST ROOM and CONVENT addn., 8585 La Mesa Blvd., LA MESA, CALIF. Carmelite Sisters, 8585 La Mesa Blvd., La Mesa, Calif.

Seven Hills Ranch, 1166 E. 58th St., Los Angeles, Calif. Owner Builds. **$560,000** 56 frame, stucco DWELLINGS, Galva, Mercada, Ashgrove, Faceta, Pescados and Farnby Sts. LA MIRADA, CALIF. C. G. Olsten, 10236 Lakewood Blvd., Downey, Calif., archt.

Sun Gold, Inc., 4330 Lemon St., Riverside, Calif. Owner Builds. **$410,000** 30 frame, stucco DWELLINGS Richview, Thaxton, Lonecrest, Parkland and Padova Sts., LA PUENTE, CALIF.

Buckeye Constr. Co., 292 S. La Cienega Blvd., Los Angeles, Calif. CA **$450,000** 20,000 sq. ft. HOSPITAL 11222 Imperial Ave., LENNOX, CALIF. Imperial Hospital, 2453 S. La Cienega Blvd., Los Angeles, Calif. David Hyum, 1025 N. Vermont Ave., Los Angeles, Calif., archt.

† **Roek Constr. Co.**, P. O. Box 783, Stockton, Calif. LB **$474,000** (9 bidders) Phase 3 PROCESS AREA (3 exposive testing bldgs., rein.-con., structural steel, 6 magazines, steel warehouse, addn. concrete block bldg. utilities and site work), near LIVERMORE, CALIF. U. S. Atomic Energy Comn., 518-17 St., Oakland, Calif.

† **Peter Kiewit Sons Co.**, Box 748, Arcadia, Calif. CA **$663,552** BACHELOR OFFICERS QUARTER at Naval Station, Inv. 14854-57, LONG BEACH, CALIF. Eleventh Naval Dist., 1220 Pacific Hy., San Diego, Calif. Bids May 22. CD 6/2, under LB.

▲ **Crown Constr. Co.**, 5059 W. Pico Blvd., Los Angeles, Calif. CA **$2,421,276**, Columbus JUNIOR HIGH SCHOOL, 22250 Elkwood St., Canoga Park, LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids May 16. CD 6/3, under LB.

▲ **Morley Constr. Co.**, 7700 Sunset Blvd., Los Angeles, Calif. CA **$3,694,000**, Grant HIGH SCHOOL, in SE San Fernando Valley LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids May 20. CD 5/22, under LB.

▲† **George A. Fuller Co. & Murray Sanders**, 3100 W. 8th St., Los Angeles, Calif. LB **$4,373,850** (6 bidders) (joint venture). constr. 315 units armed services HOUSING, Inv. 50-39 OXNARD, CALIF. Procurement Office, Oxnard Air Force Base, Calif. Bids June 4. CD 5/9.

Valley Associates, Inc., 1153 "F" St., San Bernardino, Calif. Owner Builds. **$441,980** 41 frame, stucco DWELLINGS, in Tract 4555, RIALTO, CALIF.

Hadley-Cherry, Inc., 335 N. La Cienega Blvd., Los Angeles, Calif. Owner Builds. **$369,626**, 38 stucco DWELLINGS, Notre Dame Ave., POMONA, CALIF.

(Continued on page 200)

THE NEW 200 *mile-per-hour* BEECHCRAFT TRAVEL AIR

the QUIETEST **plane in the skies**

So quiet you won't believe it . . . so vibration-free it's like sitting in your own office . . . so luxurious, so smooth, so much more for your money . . . that's the All-New Beechcraft Travel Air for 1958. A demonstration ride will prove that this is the truly outstanding airplane in the light twin field!

A quarter century of experience has gone into the New 1958 Travel Air. Its rugged and right design assures maximum performance and durability. But with rugged construction also comes the beauty and distinctiveness of superior styling.

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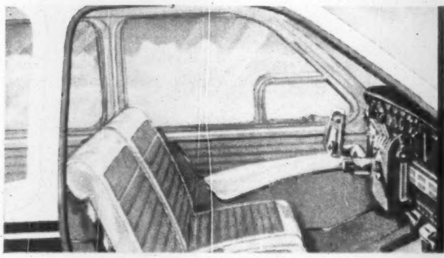
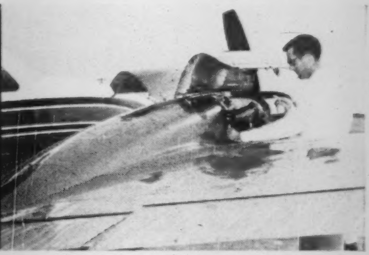


Simplicity of flying plus visibility

One of two spacious luggage compartments

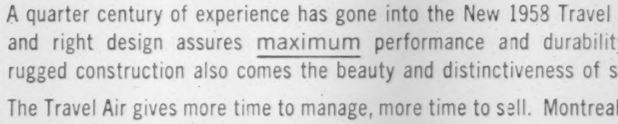


Complete accessibility for servicing

The four-place *Beechcraft* Travel Air
RANGE – up to 1,410 miles nonstop
SPEED – up to 209 miles per hour

Beechcraft

For information about the **Travel Air** and the finest leasing and financing plans in aviation, see your Beechcraft distributor or dealer, or write Beech Aircraft Corporation, Wichita 1, Kansas, U. S. A.



BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

(Continued from page 198)

▲ **Nomelinni Constr. Co.**, P. O. Box 1528, Stockton, Calif. CA **$1,282,000** three 3 story, 115,500 sq. ft. reinforced brick masonry concrete STUDENT RESIDENCE HALLS and site development for Sacramento State College. W.O. 4005GC-69, SACRAMENTO, CALIF. State Div. Architecture, 1120 N. St., Sacramento, Calif. Bids May 20, awarded June 4. CD 5/23, under LB.

Homes of Merit, 9054 E. Garvey St., San Gabriel, Calif. Owner Builds. **$616,807**, 40 frame, stucco DWELLINGS, Cromwell and Anaconda Sts., SAN BERNADINO, CALIF.

Arlo F. Buford, Inc., 1020 Highland Ave., National City, Calif. Owner Builds. **$422,842**, constr. 41 DWELLINGS, Judith St. and Green St., SAN DIEGO, CALIF.

E. A. Ries, 5234 El Cajon Blvd., San Diego, Calif. CA **$400,000**. 24,000 sq. ft. OFFICE bldg., 2760 5th Ave., SAN DIEGO, CALIF. Jas. W. Martin, 1st National Bldg., San Diego, Calif.

▲ **Bishop-Mattei Co.**, Pier 7, San Francisco, Calif. LB **$1,029,833** (4 bidders) 2 and 3 story, 12 buildings, (100 low rent HOUSING UNITS) Hunters Point, SAN FRANCISCO, CALIF. San Francisco City and County Housing Auth., 440 Turk St., San Francisco, Calif. CD 5/4/51.

CANADA

HEAVY CONSTRUCTION—BA

Que., Louiseville—BA 6/23—La Ville de Louiseville, City Hall, (1) constr. pumping station and filter plant and 500,000 gal. underground reservoir (2) excavating and filling for about 34,000 ft. piping and (3) mechanical equipment and installation of pumping station and filter plants. $800,000. Plans deposit $200 ($100 returnable). J. J. Rondeau, 10550 Verville St., Montreal, Que. Joseph Leroux, 10 Bord de l'Eau, Repentigny, Que., engr. CD 3/14.

BUILDINGS—BA

▲ **Ont., London**—RESIDENCE—BA 7/4—Bd. Governors, University of Western Ontario, Room 204, Admin. Bldg., 4 story, bsmnt., 170x245 ft., rein.-con. and stone constr. men's residence with dining hall. $1,000,000. O. Roy Moore Assocs., 260 Dundas St., London, Ont, archts. C. D. Carruthers & Wallace Consultants Ltd., 92 Yorkville Ave., Toronto, Ont., engrs. CD 2/7.

BUILDINGS—SLC

▲ **Alta., Calgary**—OFFICE—The Alberta Wheat Pool, Lougheed Bldg., soon lets contract 8 story, 104,000 sq. ft. floor area, main floor exterior finish marble, upper floors ceramic terra cotta, fully air-conditioned office bldg., 5th Ave. and 2nd St. S.W. $2,000,000. Clayton, Bond, Mogridge, 516-10th Ave. S.W., archts. CD 12/19.

HEAVY CONSTRUCTION—LB & CA

▲ **Saint John Dredging Co. Ltd.**, Bayside Dr., East Saint John, N. B., CA **$1,518,000** (6 bidders) dredging, Courtenay Bay, SAINT JOHN, N. B. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Bids Apr. 16, awarded May 26. CD 3/13.

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ONTARIO—Dpt. Hys. Parliament Bldgs., Toronto,
Storms Contg. Co. Ltd., 215 Markham Rd., Richmond Hills, Ont., CA **$527,465**, grading, culverts and gran. base 5.45 mi. Hy. 68 from Espanola southerly, Contr. 58-30, Espanola. Awarded June 2. CD 6/6, under LB.

ONTARIO—Dpt. Hys., Parliament Bldgs., Toronto,
Peel Constr. Co. Ltd., Brampton, Ont., CA **$597,395** (4 bidders) gran. base and concrete paving 2.9 mi. Hy. 401 from Hy. 27 westerly to Etobicoke Creek, Contract 58-71, Toronto. Bids May 14, awarded June 2. CD 6/4, under LB.

ONTARIO—Dpt. Hys., Parliament Bldgs., Toronto,
McNamara Road Constr. Co. Ltd., 42 Industrial St., Leaside, Ont., CA **$812,097** (1 bidder) grading, gran. base 8.24 mi. Hy. 11 from Harty westerly to Opastika River, Contr. 58-16, Harty. CD 6/4, under LB.

Salem Eng. Ltd., 1525 Bloor St. W., Toronto, O., LB **$467,041** (21 bidders), constr. Compressor Station No. 68, Stage 1, located about 11 mi. north of Port Arthur, ONTARIO. Northern Ontario Pipeline Crown Corp., c/o Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont.

James McKay & Sons Ltd., 625 Roselawn Ave., Toronto, Ont., CA **$412,392** (12 bidders) supply, installation approx. 40,000 ft. water main for reservoir constr., construction of pump house and remote pump house, incl. supplying, installing certain equipment, for constr. the electrical system, GORMLEY, ONT. Ontario Water Resources Comn., East Block, Parliament Bldgs., Toronto, Ont. Bids May 12, awarded May 27. CD 4/29.

▲ **Carter Constr. Co. Ltd.**, 419 Cherry St., Toronto, Ont., CA **$1,429,000** (12 bidders) constr. marine towers and galleries at Quebec Harbor, QUEBEC CITY, QUE. National Harbors Bd., West Block, Parliament Bldgs., Ottawa, Ont. Awarded May 28. CD 5/8, under LB.

Terminal Constr. Co. Ltd., Dominion Square Bldg., Montreal, Que., CA **$710,889**, constr. aircraft parking apron and taxiway, installation drainage and electrical services and surface treatment Runway No. 07-25, Regina Airport, REGINA, SASK. Dpt. Transport, Hunter Bldg., Ottawa, Ont. Bids Apr. 10, awarded May 28. CD 4/18, under LB.

BUILDINGS—LB & CA

▲ **Atlas Finance & Realty Corp. Ltd.**, 117-6th Ave., S. E. Calgary, Alta., Owner Builds, Over **$3,000,000**, 225 DWELLINGS and 45 six-unit APARTMENTS, ST. ALBERT, ALTA.

▲ **M. R. Chappell**, 60 Brookland St., Sydney, N. S., LB **$1,365,306** (3 bidders) Sydney ACADEMY and JUNIOR HIGH SCHOOL, Townsend and Terrace Sts., SYDNEY, N. S. City, City Hall, Sydney, N. S. Bids May 30. CD 5/9.

Ellis-Don Ltd., Box 852, London, Ont., LB **$553,700** (9 bidders) FEDERAL BLDG., STRATFORD, ONT. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Jenkins & Wright, 233 Queen St. S., Kitchener, Ont., archts.

▲ **Eastern Constr. Co. Ltd.**, Box 96, Walkerville, Ont., CA Total est. **$5,000,000**, PLANT housing bottling, case storage, shipping and receiving operations, WINDSOR, ONT. Hiram Walker & Sons Ltd., 2067 Sandwich St. E., Windsor, Ont. Bids May 14, awarded May 26.

▲ **J. S. Hewson Ltd.**, 4424 St. Catherine St. W., Montreal, Que., CA Approx. **$1,200,000**, 3 story, bsmnt., 69x171 ft. with 37x46 ft. wing, rein.-con. fdns. and frame, brick walls with stone trim, CENTRAL AUTOMATIC MESSAGE ACCOUNTING BLDG., air-conditioned, S.E. corner Pine and Oxenden Aves., MONTREAL, QUE. Bell Telephone Co. of Canada, 1050 Beaver Hall Hill, Montreal, Que. Bids May 14, awarded May 30. CD 4/28.

ALASKA

HEAVY CONSTRUCTION—LB & CA

† **Lease Co. Inc.**, 1501 N. 35 St.., Seattle, Wash., CA **$766,108** airmen's service club, Inv. 58-43, ELMENDORF AIR FORCE BASE, ALASKA. U. S. Eng., Anchorage, Alaska. Bids May 28. CD 6/4, under LB.

FOREIGN

HEAVY CONSTRUCTION—BA

▲ **Nigeria**—RAIL SYSTEM—Bids Asked in December—Nigerian Railway Corp., Lagos, constr. approx. 300 mi. Nigerian Railway and several major bridges. Total $116,000,000. Messrs. Rundel, Palmer & Triton, 125 Victoria St., London, S.W.1., engrs. CD 5/20.

AMERICANS ABROAD

HEAVY CONSTRUCTION—LB & CA

▲ **J. H. Pomeroy & Co., Inc.**, 717 Market St., San Francisco, Calif., U. S. A., **Hawaiian Dredging Co.**, Honolulu, T. H., **Standard Dredging Co.**, 80 Broad St., New York, N. Y., U. S. A. and **Atlantic Gulf & Pacific Dredging Co.**, 15 Park Row, New York, N. Y., U. S. A., CA est. **$20,000,000.** (joint venture) 40,000,000 cu. yd. dredging, deepening Suez Canal, CAIRO, EGYPT. Suez Canal Authority, Cairo, Egypt. CD 12/10.

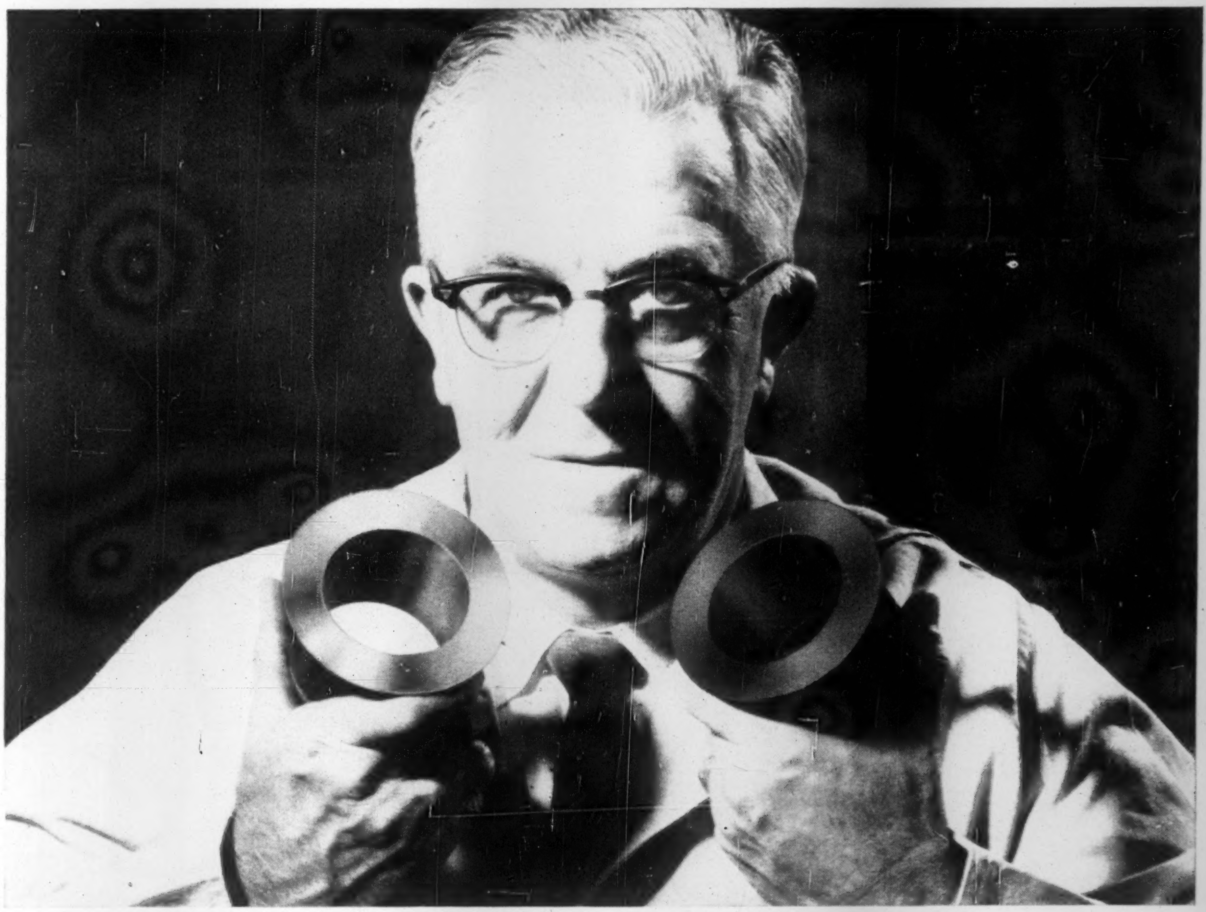
▲ **R. G. LeTourneau, Inc.**, 2399 South MacArthur St., Longview, Tex., U. S. A., CA est. **$1,000,000.** offshore drilling platform for use in Persian Gulf, IRAN, SAIPEM (sub. Ente Nazionale Idrocarburi) Govt. of Italy, Rome, Italy.

PROPOSED PROJECTS

SEWERS, WASTE DISPOSAL

▲ **Ill., Kankakee**—City, City Hall, sewage treatment plant. $1,500,000.

(Continued on page 202)



Which Twin is the PHONY?

One of these clutch sleeves will cause trouble . . . within 10,000 miles !

If you picked the sleeve on the left, you're right! That shiny, "brand-new" look is the tip-off. It means the face has been reground, removing all or most of the case-hardening necessary for long, trouble-free wear.

The sleeve face of the genuine Lipe Guaranteed Clutch at right bears the almost-black finish of newly case-hardened and Luberized steel. Case-hardening to a depth of .007" and a further surface treatment which impregnates the pores of the metal with a lubricating preservative increases the life of Lipe clutch sleeves *5 to 10 times* over that of untreated or reground sleeves.

Field rebuilders' "short cuts" mean short clutch life for you!

A reground sleeve is just one fault you may find in a field-rebuilt clutch. In addition, there may be improper balancing; faded pressure springs that cannot maintain the required torque; reground pressure plates that warp and dish under normal friction heat.

All parts in Lipe Clutches conform to high precision standards !

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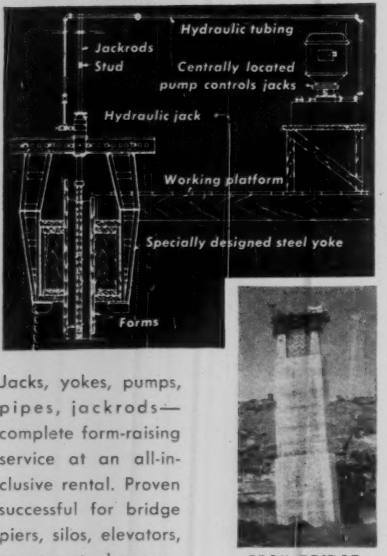
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In San Francisco: 630 Sixth St.

(Continued from page 200)

▲ **Kan., Mission**—Turkey Creek Sewer Dist., 6915 Johnson Dr., Mission, voted bonds May 27, sewerage sys. and treatment plant. **$2,320,000.** Black & Veatch, 1500 Meadow Lake Parkway, Kansas City 14, Mo., engrs. CD 5/2.

▲ **N. J., Emerson**—Borough, Borough Hall, sewerage sys. for Borough to connect with Bergen Co. Auth. disposal. **$2,500,000,** Tippetts-Abbett-McCarthy-Stratton, 62 W. 47 St., New York, N. Y., consult. engrs.

▲ **N. Y., Mineola**—Bd. Supervs. Nassau Co., Old County Court House, sanitary sewerage sys. for inwood section to be called Sewage Disposal Dist. 1, incl. disposal plant on 12-acre tract in Doughty Blvd. **$4,738,750.** Nussbaumer, Clark & Velzy, 500 Fifth Ave., New York 36, N. Y., engrs. CD 1/9.

Utah, Sandy—City, Delber Fugal Councilman, City Hall, sewage treatment plant and collection sys. **$500,000.** Caldwell, Richards & Sorensen, Zion's Saving Bldg., Salt Lake City, consult. engrs.

BRIDGES

▲ **N. Y., Buffalo**—City, Dpt. P. Wks., City Hall, replacing two bridges over New York Central and Erie Railroads, Michigan, Louisiana and Chicago Sts. **$3,250,000.** CD 8/21/47.

▲ **Wash., Yakima**—City, City Hall, overpasses crossing railroad right-of-way at Lenox Ave. **$1,000,000.** Work may begin next year. L. A. Daly & Assocs., Securities Bldg., Seattle 1, Wash., consult. engrs. CD 3/26/56.

STREETS AND ROADS

N. J., Trenton—Twp. of Hamilton, 2090 Greenwood Ave., constr. or reconstr. Brookside Ave., Cedar Lane, S. Clinton Ave., Conn. Ave., Crescent Ave., Fenwood Ave., Grayson Ave., Hollywood Dr., Joan Terrace, Johnston Ave., Marivale Place, Pacific Ave., Park Ave., Coleman Rd., Exeter Rd., and Salem Rd., Hamilton. **$550,000.** Myron X. Feld, 2090 Greenwood Ave., engr. CD 12/10/45.

NEW YORK—State Dpt. P. Wks., The Gov. Alfred E. Smith State Office Bldg., Albany,

Madison Co.—reconstr. 3.83 mi. Rte. 12 starting at Madison-Oneida Co. line and extending southward to point about ½ mi. north of Hubbardsville, FAI Project. **$750,000.**

▲ **OHIO**—Hy. Dpt., State Dpts. Bldg., Columbus,

Paulding Co.—wid'n., resurface 15 mi. US 24 incl. relocating ½ mi. near Antwerp to elminate erosion problem along Maumee River. **$2,000,000.** Plans to put under contract this summer.

▲ **PENNSYLVANIA**—Pennsylvania Highway & Bridge Auth., 506 North Office Bldg., Harrisburg,

Susquehanna Co.—rein.-con. 2.57 mi. 4-lane divided between New Milford and New Milford-Great Ben Twp. Line (Proj. 821-1) section of Sacramento-Binghamton Thruway. L.R. 1001-4A, FAI, **$3,200,000.**

rein.-con. 4.63 mi. 4-lane divided between New Milford-Great Bend Twp. line and Hallstead, section of Scranton-Binghamton Thruway. (Proj. 821-2), L.R. 1001-4B, FAI, **$3,301,700.**

rein.-con. 2.53 mi. 4-lane divided between Hallstead and New York State Line (Proj. 821-3), section of Scranton-Binghamton Thruway, L.R. 1001-4C, FAI, **$3,800,000.** S. P. Longstreet, c/o owner, ch. engr. CD 1/27.

▲ **PENNSYLVANIA**—State Highway & Bridge Auth., 506 North Office Bldg., Harrisburg,

Delaware Co.—reconstr. 4.31 mi. on State Rte. 3 between Newtown Square and Highland Park. **$1,060,000.** S. P. Longstreet, c/o owner, ch. engr.

Tex., Houston—City, City Hall, asphalt paving Richmond Ave. E. Property line to Kirby Dr. **$150,000.** Edminister Eng. Co., 2610 Sunset Blvd., consult. engr.; asphalt paving, N. Breswood St. **$800,000.** CD 1/29.

Tex., Jacksonville—Road Dist. No. 1, c/o Courthouse, farm road paving program. **$500,000.** CD 5/9/56.

EARTHWORK, WATERWAYS

▲ **Quebec**—Quebec Hydro Electric Power Comn., 107 Craig St. W., Montreal, second hydro-electric power house on Bersimis River, about 40 mi. from Baie Comeau, 22 miles downstream from dam site, **$40,000,000.** H. G. Acres & Co., 1259 Dorchester Rd., Niagara Falls, Ont., consult. engrs. CD 8/7/52.

AIRPORTS

▲ **Okla., Tulsa**—AIRPORT IMPRVS.—City, (Tulsa Aviation Auth.), c/o City Hall, plans by Murray-Jones-Murray, 4238 S. Peoria, airport work, **$8,400,000.** David R. Graham & Assocs., 2919 E. 44th Place, consult. engrs. CD 5/13.

LATIN AMERICA

▲ **Venezuela, Caracas**—HOTEL, etc.—Hilton Hotels International, Waldorf Astoria, New York 2, N. Y., U. S. A., plans by Tomas J. Sanabria, Caracas, Caracas Hilton Hotel office bldg., shops, swimming pool, etc. Avenida Andres Bello and Avenida Vollmer. **$20,000,000.** Constr. 1959.

AMERICANS ABROAD

▲ **Thailand, Bangkok**—HOTEL—Pan American Airways, 135 E. 42 St., New York, N. Y., U. S. A., plans hotel. **$8,000,000,-$10,000,000.**

PUBLIC BUILDINGS

▲ **Ala., Tuscaloosa**—SCHOOL—Bd. Educ., City Hall, **$3,000,000** bond election Sept. 15, schools. CD 2/1/46.

Calif., Lompoc—SCHOOLS—Lompoc Union Elementary School District, Lompoc, plans by Pierre Clayessens, 1941 Wilshire Blvd., Los Angeles, 7 bldgs., 27,318 sq. ft. elementary school. **$600,000.**

▲ **Calif., Sacramento**—STATE OFFICE—State Div. Architecture, 1120 N. St., 14 story 416,000 sq. ft. floor space state office bldg., "O" St., 8th and 9th Sts. for State Retirement Sys. **$12,669,000.** CD 7/16.

▲ **Colo., Lakewood**—SCHOOLS—Jefferson Co. School Bd. Dist., No. R-1, 1580 Yarrow, Lakewood, voted **$9,940,000,** bonds, May 27, Senior High School; two Junior High Schools; nine elementary schools and addns. to 2 high schools and 5 grade schools, in Arvada, Wheatridge, Golden, Lakewood. CD 3/12/58.

▲ **Conn., Ellington**—HOUSING—Philip A. Winston, Filter Bed Rd., 75 Houses, "Knollwood" second section, Windsorville Rd. **$1,012,500.**

▲ **Conn., Hartford**—FIRE HOUSES—City, City Hall, plans by Ebbets, Frid & Prentice, 862 Asylum Ave., Hartford, 4 Fire Houses, Franklin Ave., Sisson Ave. Park St., Westland St. **$1,200,000.** (These four will be let as one project.)

▲ **Conn., New Canaan**—SCHOOL—Town, Town Hall, plans by Fairfield Assocs., 70 Elm St., high school addn., New South Ave. **$1,000,000.** CD 11/25.

▲ **Ill., Waukegan**—COURTHOUSE—Lake Co., Court House, Waukegan, courthouse. **$5,000,000.** CD 11/29/46.

Kan., Olathe—HOME FOR AGED—Johnson Co. Welfare Advisory Bd., Court House, 3 story, 100-patient, fireproof Home for Aged. **$600,000.**

▲ **Mass., Dalton**—SCHOOL—Central Berkshire Regional School Dist., c/o Thomas H. White, supt. Schools, Dalton, plans by Freeman, French & Freeman, 158 Bank St., Burlington, Vt., Regional High School. **$2,000,000.**

▲ **Mass., Northampton**—SCHOOL—City, School Bldg., Comn., Victor Christenson, chn., Florence, Mass., plans by M. A. Dyer, Co., 24 School St., Boston, high school Florence section, Bridge St. **$1,000,000.** Constr. 1959.

Mass., Weston—SCHOOL—Town, School Bldg. Comn., James S. Turner, chn., c/o Supt. Schools, School St., plans by Hugh A. Stubbins & Assoc., 806 Mass. Ave., Cambridge, elementary school, off Wellesley St. **$754,000.** Bids late 1958. CD 12/27.

Mich., Coopersville—SCHOOL—Bd. Educ., Coopersville P. Schools, plans by W. B. MacWhirter & Assoc., 1017 Cottage Grove, Grand Rapids, high school. **$900,000.**

▲ **Mich., Utica**—SCHOOL—Bd. Educ., Utica Community Schools, plans by Smith & Smith, 2908 N. Woodward, Royal Oak, Junior High School. **$1,180,000.**

▲ **Minn., Minneapolis**—SCHOOL—Bd. Educ., Mrs. F. Lehman, pres., 807 Broadway N.E., addn. to Hamilton Elementary School; James and Fourth Aves. North, **$900,000;** modernize Dowling School for Crippled Children, 3900 West River Rd. **$500,000.**

▲ **Mo., Maplewood (St. Louis 17, P. O.)**—SCHOOLS—Maplewood Richmond Heights School Dist., E. R. Adams, supt. Schools, 7539 Manchester Rd., Maplewood 17, defeated **$1,200,000** bonds May 27, school imprvs. incl. Sutton Elementary School addn., girls' gymnasium, at Senior High School; gymnasium at West Richmond School; addns., etc. at other schools. CD 5/15.

N. J., Chatham—SCHOOL—Bd. Educ., Twp. of Chatham, elementary school addn., Lafayette Ave. **$750,000.**

N. J., Dunellen—SCHOOL—Bd. Educ., referendum scheduled for June 26, high school addn. **$700,000.** Alfonso Alverez, 243 Lorraine Ave., Upper Montclair, archt. CD 3/31.

▲ **N. J., Morristown**—SCHOOL—Bd. Educ., voted bonds May 27, high school, **$1,735,000.** CD 5/15.

N. J., Newark—LIBRARY—City, City Hall, business library bldg. for central business district, **$500,000.**

▲ **N. J., New Brunswick**—COURT HOUSE—Middlesex Co., plans by Alexander, Merchant & Assocs., 1 Elm Row, county court house. **$3,000,000,** Fred S. Dubin Assocs., 178 S. Whitney St., Hartford, Conn., consult. engrs., CD 9/28/56.

N. J., North Plainfield—SCHOOL—Bd. Educ., referendum called for June 10, 2 story addn. to High School Annex. **$800,000.** Target for completion Sept. 1959. CD 11/27.

N. J., Pleasantville—SCHOOL—Regional High School Bd., c/o John Gibson, 1126 McConnell Dr., plans by Frederic P. Wiedersum, 1051 Bloomfield Ave., Clifton, Regional High School. **$500,000.**

N. J., Pompton Lakes—SCHOOL—Bd. Educ., voted bonds May 27, high school addn. **$975,000,** Emil Schmidlin, 586 Central Ave. E., Orange, archt. CD 4/23.

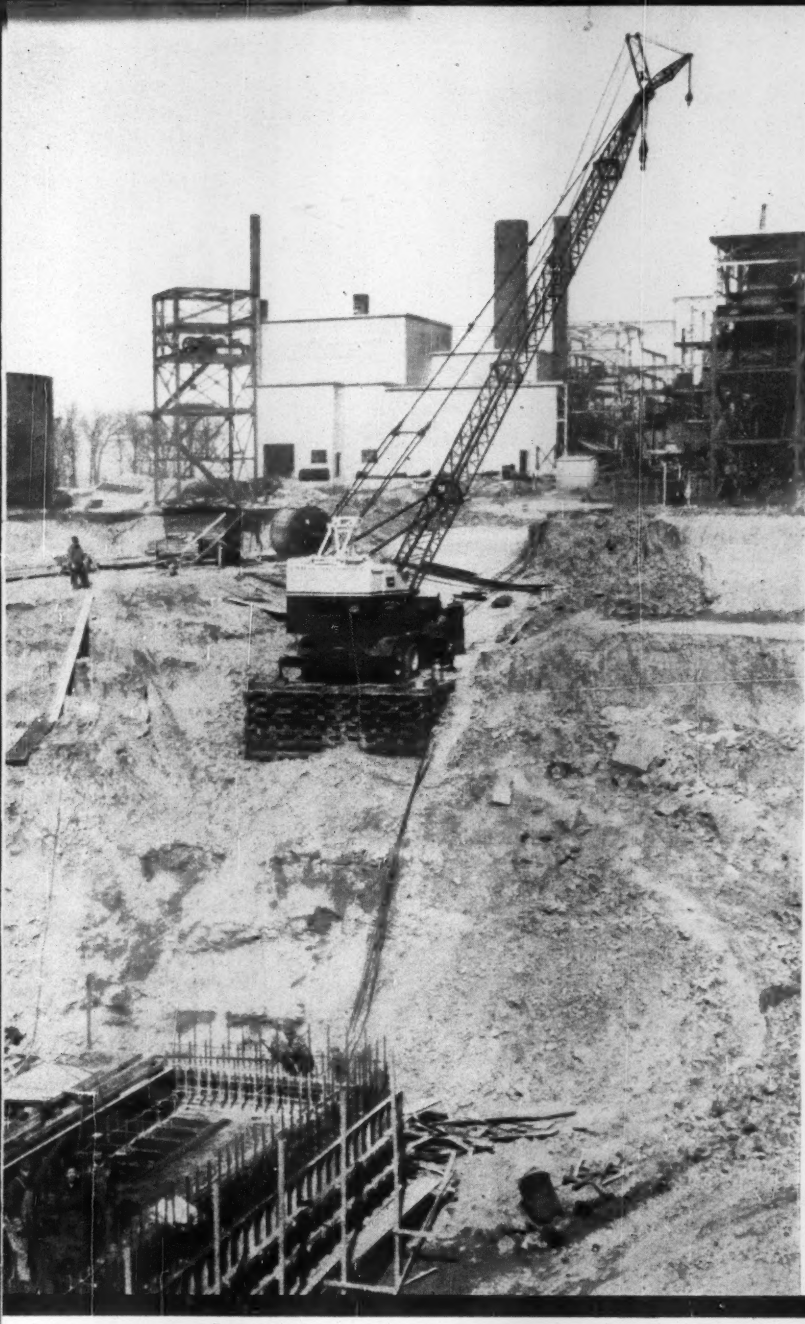
▲ **N. Y., Buffalo**—SCHOOLS—Bd. Educ., City Hall, plans by Paul, Hauch & Welch, 250 Delaware Ave., Grover Cleveland High school addn., **$900,000.** Bids in June. CD 12/20/56; plans by Anthony L. Carlino, 277 Delaware Ave., Elementary School No. 49. **$344,000.** Bids August-September; plans by Stanley C. Podd, 361 Delaware Ave., Elementary School No. 90, **$975,000.** Bids in July; plans by James, Meadows & Howard, 250 Delaware Ave., Junior High School No. 91. **$2,200,000.**

N. Y., Holland—SCHOOL—Holland Central School Bd., elementary school. **$550,000.**

▲ **N. Y., New Rochelle**—SCHOOL—City, City Hall, approved June 3, school. **$7,800,000.** CD 2/19.

N. Y., Tonowanda—SCHOOL—Union Free School Dist. 1, 1500 Colvin Ave., Kenmore, plans by Fenno, Reynolds

(Continued on page 204)



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43-M	1	Yes	Yes	Yes	——
362	1½	Yes	Yes	——	Yes
93-M	2½	Yes	Yes	——	Yes
101-M	3	——	Yes	——	——
111-M	4	——	Yes	——	——

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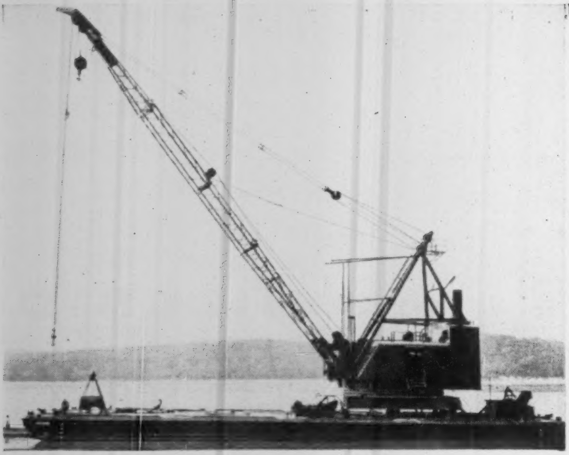

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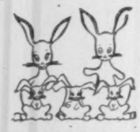

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(Continued from page 202)

& McNeil, 2000 Sheridan Rd., Kenmore, Alexander Hamilton Elementary School. $900,000.

O., **Defiance**—SCHOOL, etc.—Defiance Bd. Educ., Central Local School Dist., defeated bonds May 6, high school, remodel existing school, $980,000. CD 1/16.

O., **Massillon**—HOSPITAL—Ohio Dpt. P. Wks., State Dpts. Bldg., Columbus, plans by McGeorge, Hargett & Assocs., 7016 Euclid Ave., Cleveland, Zone 3, Central food preparation and service unit at Massillon State Hospital, for Dpt. Mental Hygiene & Correction. $750,000. CD 9/28/56.

▲ O., **Parma**—SCHOOLS, etc.—Bd. Educ., 5401 W. 54th St., Cleveland, Zone 29, plans by Mellenbrook, Foley & Scott, 20 Beech St., Berea, elementary school similar to new Forrest Elementary School, $500,000; Forrest Elementary School, $500,000, bids soon; plans by Dalton & Dalton, The Arcade, Cleveland, Zone 14, central warehouse and office bldg., $350,000-$375,000, plans by John Lipaj & Assocs., The Arcade, Cleveland 14, O., elementary school, with 13 classrooms, $350,000. CD 5/12.

O., **Reynoldsburg**—SCHOOL—Bd. Educ., Reynoldsburg, elementary school, Rose Hill subdivision, $591,000.

▲ Pa., **Greenville**—SCHOOL—Pa. P. School Bldg. Auth. 101 S. 25th St., Harrisburg, school for Reynolds Area Jt. School Bldg., Greenville R. D. 5 $2,050,951.

▲ Pa., **Kittanning**—HOSPITAL—Armstrong County Memorial Hospital, hospital bldg. $1,569,000.

▲ Pa., **White Haven**—WARD—General State Auth., 18 and Herr Sts., Harrisburg, plans by L. F. Boulware, Fidelity Trust Bldg., Phila., Pa., four ward buildings with 640-bed capacity, central kitchen and personnel dining room bldg., utilities, White Haven State School $5,000,000. CD 12/20/56. A. F. Jones, c/o owner, ch. engr.

▲ Tex., **Amarillo**—SCHOOL—Amarillo Ind. School Dist., Amarillo, plans by H. Ensign, W. Henry Fowler, & J. Chester Wright, 1312 W. 15th St., Junior High School, in Olsen Park Addn., $1,000,000, Bids in August; plans by Shiver & Mergert, c/o Fiske M&M Bldg., elementary school, North Amarillo in Hamlet Addn., $750,000. CD 7/18.

▲ Tex., **Austin**—INSURANCE—State of Texas Comptrollers Office, Main Administration Bldg., plans by George & Abel B. Pierce, 2200 Welch St., Houston, Tex., insurance bldg. $1,000,000. Constr. in 1959. CD 6/14/57.

Tex., **Perryton**—SCHOOL—Perryton Ind. School Dist. plans by Brasher, Spencer & Coyette, 2118-34th St., Lubbock, high school. $750,000.

Tex., **Sulphur Springs**—SCHOOL—Sulphur Springs Ind. School Dist. plans by White & Feinberg, 2214 Cedar Springs, Dallas, high school. $650,000.

Tex., **Wilmeer-Hutchins**—SCHOOL—Wilmer-Hutchins Ind. School Dist., plans by Hedrick, Stanley & Morey, archts-consult. engrs., 904 Fort Worth Ave., Dallas, school. $500,000. CD 7/16.

Wasn., **Bremerton**—COLLEGE—School Dist. No. 100-C, plans by Branch & Branch, Bremerton, Olympic Junior College addn. $787,400. CD 3/18.

Wash., **Colville**—SCHOOL—School Dist. 115, voted $600,000 bonds May 20, high school, $859,339, Cowan & Paddock, Larson Bldg., Yakima, archts., CD 4/25.

▲ N. B., **Fredericton**—RESIDENCES, etc.—University of New Brunswick, Fredericton, three residences, $1,200,000; Science Bldg., $950,000; Academic Bldg., $350,000; dining hall, $500,000; utilities, $200,000. Larson & Larson, Reynolda Station, Winston-Salem; N. C., U. S. A., master planners.

Que., **Gaspe**—SCHOOL—Commission Scolaire de Gaspe, P. O. Box 103, school. $700,000.

Que., **Jonquiere**—SCHOOL—La Commission Scolaire de Jonquiere, Jonquiere, plans by Evans St. Gelais, 140 St. Dominique St., school. $800,000. CD 7/8/54.

COMMERCIAL BUILDINGS

▲ Calif., **Sacramento**—DEPARTMENT STORE—Broadway-Hale Stores, Inc., 9th and K Sts., 2 story, 125,000 sq. ft. department store in Arden Fair Shopping Center near Sacramento. $5,000,000. Constr. in 2 years.

▲ Calif., **San Francisco**—APARTMENT HOUSE—Callan Constr. Co., developer, 2790 Junipero Serra, Daly City, apartment house proj. at Lake Merced and Skyline Blvd. $10,000,000.

Conn., **Fairfield**—HOUSING—MacDarlen Constr. Co., 452 Brookside Dr., 60 houses, Samp Mortar Lake Area. $899,400.

▲ Conn., **Milford**—HOUSING—MacDarlen Constr. Co., 452 Brookside Dr., Fairfield. 100 houses, Orchard Hillside area. $1,490,000.

▲ Conn., **Monroe**—HOUSING—Steiner, Inc., Glenridge Rd., Fairfield, 90 houses "Purdy Hill Estates" second section, Purdy Hill Rd. $1,413,000.

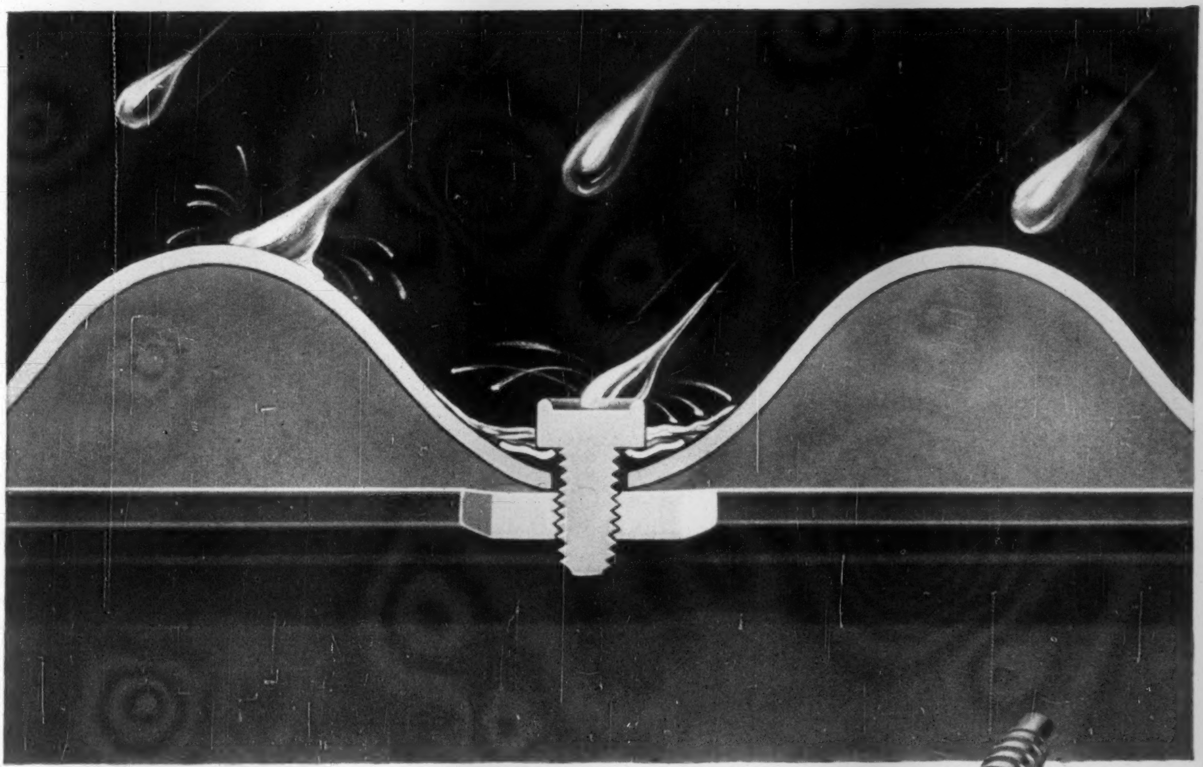
▲ Conn., **New Haven**—ART and ARCHITECTURE—Yale University, 119 College St., plans by Paul Rudolph, c/o Dpt. Architecture, Yale University, New Haven, multi-story to replace August St. Hall, 102,000 sq. ft. classroom bldg. for Yale School of Art & Architecture. $2,500,000.

Fla., **Miami Beach**—APARTMENT—Saluda, Inc., c/o Melvin Grossman, archt., 324 Mercantile Bldg., 4 story, 58x400 RIC Apartment Hotel, 41st and Pine Tree Dr. $800,000.

▲ Ky., **St. Matthews**—HOTEL—J. Graham Brown, Brown Hotel, 4th and Broadway, Louisville, suburban hotel, Hy. 60. $3,000,000.

▲ La., **New Orleans**—HOTEL, etc.—Hotel Dieu, Sister Carlos Admin., 2004 Tulane Ave., plans by Andry &

(Continued on page 209)



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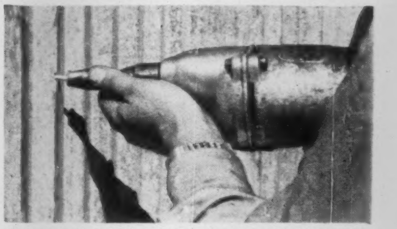

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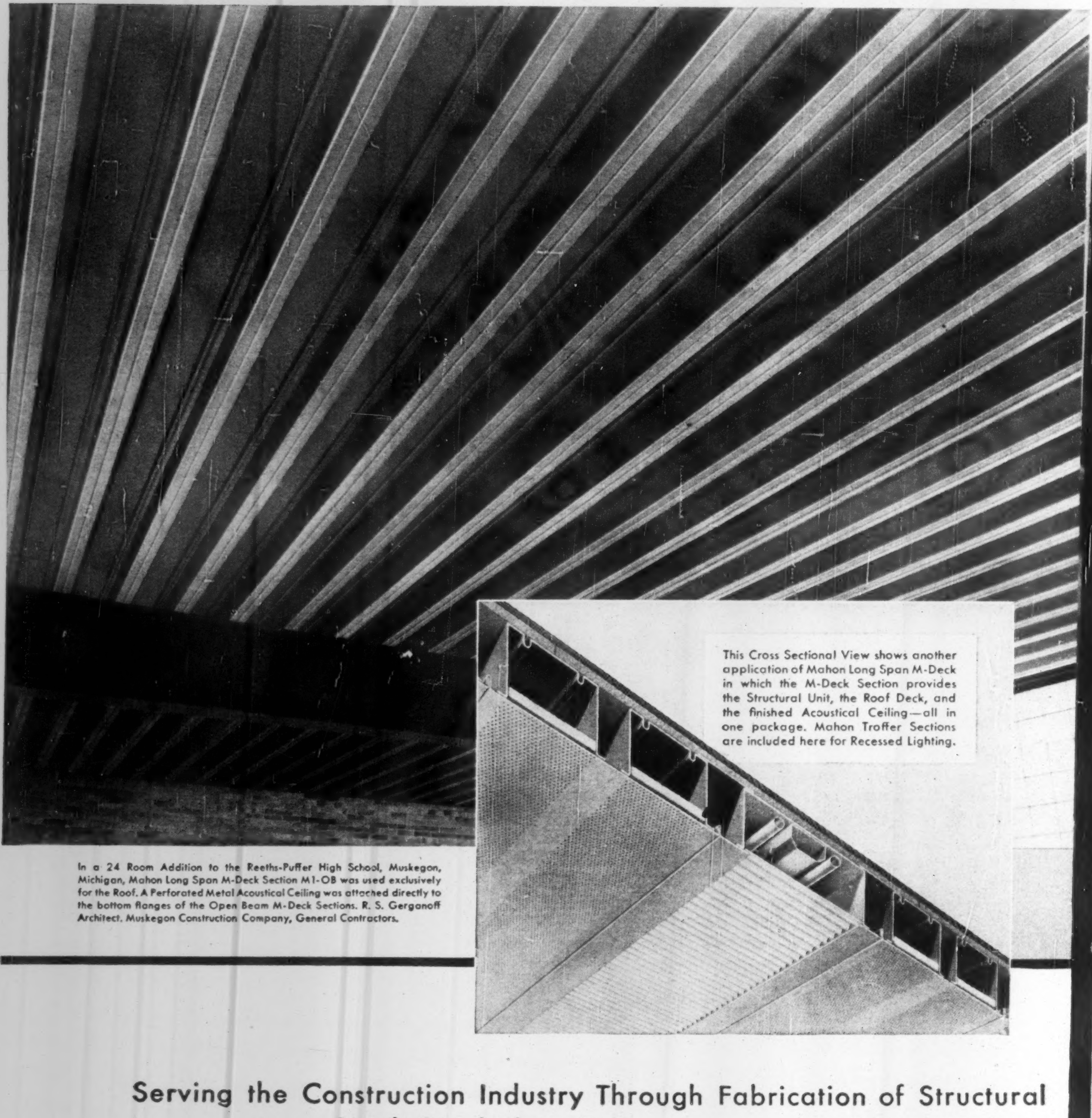

In a 24 Room Addition to the Reeths-Puffer High School, Muskegon, Michigan, Mahon Long Span M-Deck Section M1-OB was used exclusively for the Roof. A Perforated Metal Acoustical Ceiling was attached directly to the bottom flanges of the Open Beam M-Deck Sections. R. S. Gerganoff Architect. Muskegon Construction Company, General Contractors.

This Cross Sectional View shows another application of Mahon Long Span M-Deck in which the M-Deck Section provides the Structural Unit, the Roof Deck, and the finished Acoustical Ceiling—all in one package. Mahon Troffer Sections are included here for Recessed Lighting.

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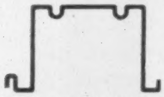
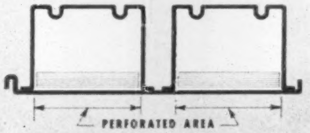
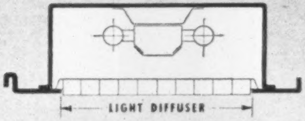


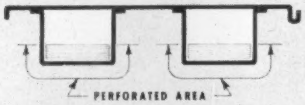
SECTION M1-OB
OPEN BEAM DEPTH 3", 4½", 6" or 7½"



SECTION M2SR (Acoustical)
CEL-BEAM DEPTH 3", 4½", 6" or 7½"



SECTION M1T (Troffer)
DEPTH 6" or 7½"



SECTION M2 (Acoustical)
CEL-BEAM DEPTH 1½", 3", 4½", 6 or 7½"

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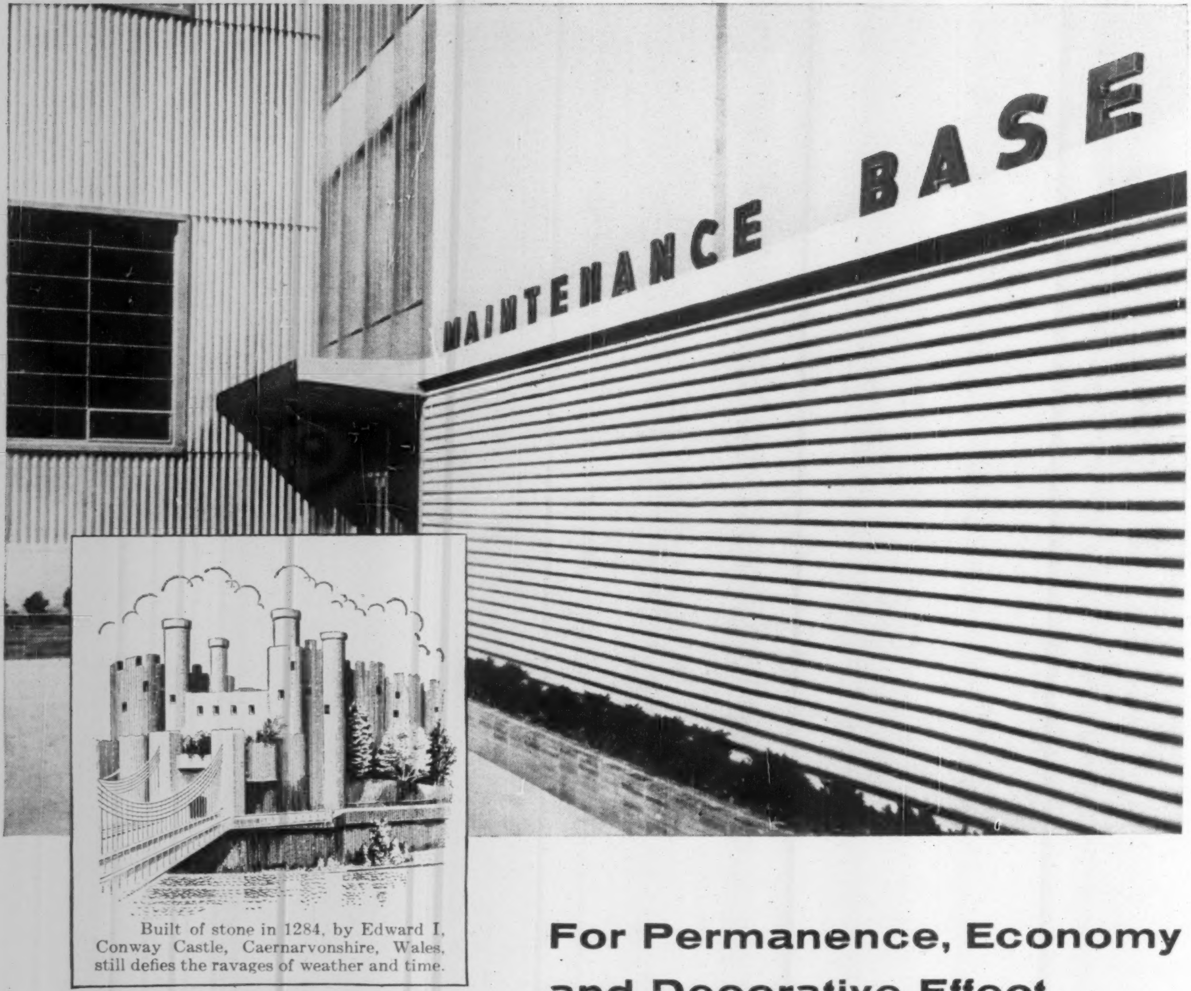

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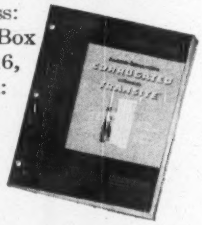

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JOHNS-MANVILLE JM PRODUCTS

(Continued from page 204)

Feitel, Carondelet Bldg., New Orleans, La. and Belli & Belli, 2554 N. McVicker Ave., Chicago 3, Ill., expansion and renovation of Hotel Dieu; Dibert Memorial hospital, Tulane Ave., and constr. 7 story L shaped hospital, and completing another 3 story bldg., Johnson and Gravier St. $4,500,000.

Md., Annapolis — SANCTUARY — College Ave. Baptist Church, Annapolis, plans by McLeod & Ferrara, 1200 18th St., N. W., Wash., D. C., sanctuary bldg. at present site. $500,000.

▲ **Mass., Shrewsbury**—SCHOOL—St. John's Preparatory School, Brothers of St. Francis Xavier, Brd. Chad CFX Headmaster, Temple St., Worcester, plans by Chester F. Wright, 681 Main St., Waltham, Mass., preparatory school, Main St. $1,500,000.

▲ **Mass., Swampscott**—SHOPPING CENTER—Louis H. Salvage, Trapelo Rd., plans by David J. Abrahams & Assoc., 651 Boylston St., Boston, shopping center, incl. department store, supermarket, 7 other stores with offices; Paradise Rd. and Salem St. $2,000,000. Bids probably before end of summer.

▲ **Mass., Waltham**—ADMINISTRATION—Brandeis University, 415 South St., plans by Hugh A. Stubbins, Jr., 78 Mt. Auburn St., Cambridge, administration bldg. on campus. $1,000,000. Fred S. Dubin & Assocs., 178 S. Whitney St., Hartford, Conn., consult. engrs. CD 1/8.

Mass., Wellesley — DORMITORY — Wellesley College, Wellesley, plans by Shepley, Bulfinch, Richardson & Abbott, 1 Court St., Boston, dormitory on campus. $500,000. Constr. late 1958.

Mass., Worcester—SHOPPING CENTER—Webster Square Trust, c/o Sumner Schein, archt., 271 Huntington Ave., Boston, shopping center, Webster Sq. $500,000. Zayre Department Store, 760 Fellsway, Medford, Mass. lessee for one store. Bids June or July 1958.

▲ **Minn., Minneapolis**—HOME—Mount Olivet Homes, Inc., Rev. R. K. Youngdahl, 5025 Knox Ave. South, plans by H. R. Fridlund, 6009 Wayzata Blvd., Home for the Aged (two units), 5511 Lyndale Ave. South. $1,000,000. CD 1/27.

▲ **N. H., Hanover**—DORMITORIES—Dartmouth College, Hanover, plans by Campbell & Oldridge, 38 Newberry St., Boston, Mass., 6 dormitories. $3,000,000. Fred S. Dubin Assocs., 178 S. Whitney St., Hartford, Conn., consult. engrs.

▲ **N. H., Salem**—SHOPPING CENTER—Mel Goldshine, 5 Durham St., Nashua, L-shaped bldg., brick, block, 80,000 sq. ft. shopping center on Rte. 28, $1,000,000. Herbert Engineering, Inc., 151 Main St., Worcester, Mass., consult. engr.

N. J., Hackensack—APARTMENT—Goodman, Guidera & Marron, Lydecker Rd., Englewood, luxury type apartment, 282 Prospect Ave. $500,000.

N. J., Lawrenceville—CHEMISTRY LABORATORY, etc.—Lawrenceville School, Lawrenceville Rd., plans by Livingston Smith, 1601 Chestnut St., Phila., Pa., chemistry laboratory addn., incl. 4 classrooms, preparation and study rooms and planetarium room. $500,000.

N. J., Newark—APARTMENT—Pomona Gardens, Inc., 683 Pomona Ave., 5 story, 80 unit apartment, Elizabeth Ave. $900,000.

N. J., Rutherford—SCHOOL—Archdiocese of Paterson and Parish of St. Mary's 91 Home Ave., school, Ames Ave. $500,000.

N. Y., Amsterdam—DORMITORY—St. Mary's Hospital, Sister Frederick, admin., Amsterdam, Proj. No. N. Y. 30-CH-79(H), dormitory to house 88 student nurses, etc. $759,000.

▲ **N. Y., Buffalo**—HOSPITAL—Deaconess Hospital, 563 Riley St., plans by James Meadows & Howard, 250 Delaware Ave., hospital addns., alterations. $2,750,000. Beeman & Candee, 220 Delaware Ave., and E. S. Burrows, 259 Delaware Ave., structural and mechanical engrs. CD 7/11.

▲ **N. Y., Buffalo**—SCHOOL—R. C. Diocese of Buffalo, 15 Niagara Sq., plans by Paly, Hauch & Welch, 232 Delaware Ave., Bishop Turner school for boys. $1,200,000. CD 10/7.

N. Y., Buffalo — SHOPPING CENTER — King Builders, 3580 Harlem Rd., Cheektowaga, plans by Anthony Carlino, 277 Delaware Ave., shopping center, Delaware Ave. and Dreyer. $750,000.

▲ **N. Y., Dunkirk**—SHOPPING CENTER, etc.—J. Santora Co., 68 Bull Ave., Buffalo, plans by Anthony Carlino, 277 Delaware Ave., Buffalo, 135,000 sq. ft. shopping center incl. parking for 1,800 cars. $1,600,000.

▲ **O., Cincinnati**—BANK-OFFICE—Central Trust Co. 4th and Vine Sts., plans by Bank Bldg. Equipment Co., 1130 Hampton Ave., St. Louis, Mo., 4 story, 50,000 sq. ft. bank-office building. $1,000,000.

O., Cincinnati—HOSPITAL—Cincinnati Osteopathic Hospital Assn., 2076 Elm, Norwood, plans by Robert Cromer, 18 E. 4th St., 1 story, bsmnt., 58-bed hospital, Galbraith and Kenwood, $600,000. John Burgess, 128 Lakeview, Battle Creek, Mich. assoc. archt. Wayne Bird, Union St., Jackson, Mich., consult. engrs. Bids in August, CD 10/28.

▲ **Okla., Tulsa**—HOUSING, etc.—Long Bell Lumber Co., 801 E. 3rd St., 448-unit housing development, and shopping center, 31st and Memorial Dr. $10,000,000.

▲ **Pa., Altoona**—HOSPITAL—Mercy Hospital, 2601 8th Ave., hospital. $1,500,000.

▲ **Pa., Camp Hill**—SHOPPING CENTER—Kravitz Developing Co., c/o H. S. Eden, archt., 23 S. Front St., Harrisburg, 40 store shopping center, 32nd St. and Trindle Rd. $5,000,000. Bids in August.

Pa., Phila.—FUNERAL CHAPEL—Joseph Goldstein, 2129 N. Broad St., funeral chapel. $500,000.

▲ **Pa., Pittsburgh**—HOSPITAL—South Side Hospital, S. 20th and Jane St., hospital addn. $1,000,000.

▲ **Pa., Pottsville**—HOSPITAL—Pottsville Hospital, Pottsville, hospital bldg. addn. $1,137,000.

Pa., Strafford—SUPERMARKET, etc.—Hanna Realty Co., Blue Grass and Grant Rds., Phila., supermarket and 6 stores. $500,000.

S. C., Columbia—SEMINARY—Lutheran Seminary, 4201 Main St., John L. Yost, pres., theological seminary expansion. $750,000.

▲ **Tex., Bellaire**—SHOPPING CENTER—Frank K. Meyer, c/o Werlin & Kiefner, archts., 3501 Buffalo Dr., Houston, Tex., shopping center, Richmond and Chimney Rock Road. $1,500,000.

Tex., Dallas—REGIONAL OFFICE—Allstate Insurance Co. of Sears, Roebuck & Co., 5334 Ross St., plans by Geo. L. Dahl, archts.-consult. engrs. 2101 N. St., Dallas, 55,000 sq. ft. regional office, 7 acre tract. $500,000.

▲ **Tex., Houston**—APARTMENT—Farb Interests, c/o Harold & Albert Farb, 2015 S. Shepard, plans by Crochet & Co., 2421 W. Holcombe, 428-unit apartment. $3,500,000. CD 5/27.

▲ **Tex., Houston**—SHOPPING CENTER—Farb Interests c/o Harold & Albert Farb, 2015 S. Shepard, plans by Crochet & Co., 2421 W. Holcombe, shopping center. $2,225,000. CD 5/27.

Tex., Houston—APARTMENT—Paul R. Gilbert, 7315 Lawndale St., apartment. $500,000.

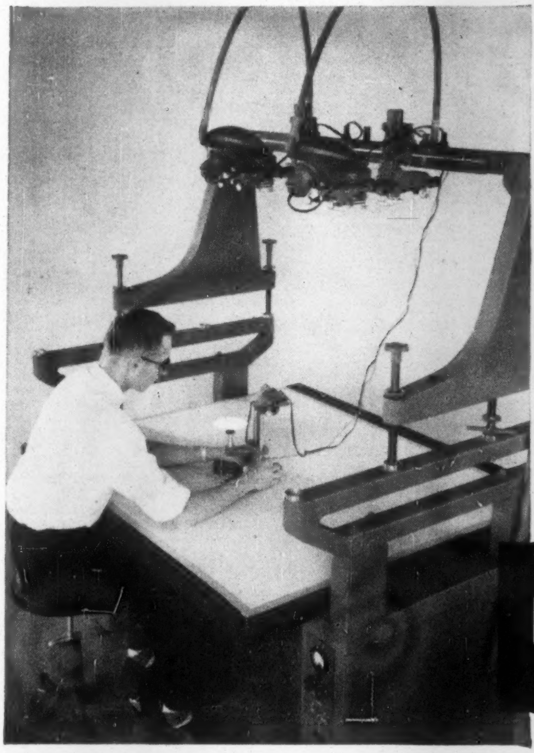
Tex., Houston — CLUB — Glenhaven Country Club, 9604 Main, plans by Hedrick, Stanley & Lightfoot, consult. engrs. and archts., 5201 Fannin St., club building. $750,000. CD 5/26.

▲ **Tex., Houston**—DEPARTMENT STORE—Montgomery Ward & Co., 6200 St. John St., Kansas City, Mo. department store, Griggs Rd. and S. Park Blvd. $1,800,000. CD 9/30.

Tex., Houston—APARTMENT—David Philley & Assocs., 9331 Wickford, plans by William Hoff, c/o owners, 60 unit apartment "Memorial Woods" Subdivision, $650,000.

▲ **Tex., Lubbock**—BANK and OFFICE—Citizens National Bank, c/o Jno. A. Hughes, pres., 1300 Avenue K, plans by Butler-Kimmel Co., 412 Avenue M, bank-office; parking facilities. $2,500,000.

Tex., Odessa—SHOPPING CENTER—Providence Investment Corp., J. D. O'Michael, mgr., Odessa, plans by



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Leonard F. Crockett & Associates, 506 N. Lincoln St., 52,000 sq. ft. shopping center. **$500,000.**

▲ **Wash., Bellingham**—APARTMENT—Hallcrest, Inc., c/o W. H. Gordon & Assocs., archts., 319 E. Champion St., 5 or 6 story, 100-unit apartment, **$1,000,000.**

▲ **Wash., Bellingham**—HOSPITAL—St. Joseph's Hospital, 40-bed hospital addn., **$1,000,000,** Bids may be called this year.

Wash., Everett—HOSPITAL—Everett General Hospital, 40-bed hospital addn., **$500,000.**

▲ **Wash., Spokane**—HOSPITAL—Dominican Sisters, N 830 Summit Blvd., 160 bed hospital, **$1,500,000.**

Wash., Tacoma—HOSPITAL—North Pacific Beneficial Assn., 801 E. Wright St., hospital addn. **$600,000.**

Wis., Ripon—DORMITORY—Ripon College plans by F. C. Shattuck Assocs., 174 E. North Water St., Neewnah, womens' dormitory. **$500,000.**

▲ **Alta., Calgary**—EXHIBITION—Calgary Exhibition & Stampede, Victoria Park, Calgary, plans by J. Stevenson & Assocs., 344 12th Ave. S.W., 240x400 ft. steel, frame, masonry and steel paneled walls, split level exhibits bldg., Victoria Park. **$1,500,000.**

N. S., Halifax—MENS RESIDENCE—Dalhousie University, Studley Rd., Men's residence, at University. **$550,000.**

Ont., Toronto—APARTMENT—B. Coles & S. Starkman, 977 Avenue Rd., plans by Uno Pril & Sharon, 214 Merton St., 83 suites 5½ story, brick walls, apartment., Victoria Park Ave. at Lawrence Ave. **$664,000.**

Que., Hauterive—HOUSING—La Familiale de Constr. Ltee., Hauterive, Que., 50 single family dwellings in newly-sub-divided section of town. **$500,000.**

▲ **Que., Quebec City**—HOTEL—Hotel St. Louis, 32 St. Louis St., Quebec City, plans by Andre Tessier, Fred A. Walker, both 1075 Vincent Massey St., Quebec City, and Ian Martin, Victor Prus, both 4693 Sherbrooke St. W., Montreal, 12 story with rein. con. frame Hotel annex. **$1,500,000.**

INDUSTRIAL BUILDINGS

▲ **Calif., Alvarado**—PLANT—The Campbell Chain Co., 415 Norway St., York, Pa., 175,000 sq. ft. industrial plant for manufacturing chain. **$2,000,000.**

▲ **Del., Wilmington**—AUTO PARKING—Wilmington Parking Auth., 9th and Orange Sts., auto parking bldg., 6th and Orange Sts. **$1,000,000.** Wilbur Smith & Assoc., 495 Orange St., New Haven, Conn., consult. engrs.

▲ **Mass., Burlington**—LABORATORY—Cabot, Cabot & Forbes Co., 60 State St., Boston, Mass., 150,000 sq. ft. laboratory, Route 128. **$2,250,000.** Raytheon Mfg. Co., Microwave & Power Tube Div., Foundry St., Waltham, lessee.

Mo., Warrenton—MANUFACTURING PLANT—Bickley Mfg. Co., Warrenton, 84,000 sq. ft. addn. to house roller die facilities for cold roll forming of metal parts and components used in manufacturing of truck bodies and other products. **$840,000.**

N. J., Bound Brook—PLANT—American Cyanamid Corp., Outer Dock Rd., Woodbridge, 1 and 2 story 80,000 sq. ft., steel, concrete plant, **$800,000.**

▲ **N. J., Princeton**—PLANT—Columbia Carbon Co., 380 Madison Ave., New York, N. Y., plans by Fulmer & Bowers, 341 Nassau St., 1 story 60 x 200 ft., and 100 x 180 ft., brick, glass and enameled brick and porcelain bldgs., Plainsboro Rd. **$1,000,000**

▲† **N. Y., West Milton**—REACTOR PLANT—Atomic Energy Comn., P.O. Box 1069, Schenectady, destroyer reactor plant at Knolls Laboratory. **$35,000,000.**

▲ **Pa., Phila.**—INDUSTRIAL PARK—Robert Saligman, 2701 N. Broad St., industrial park, Roosevelt Blvd. and Haldeman Ave. Over **$5,000,000.** Site purchased.

Tex., Arlington—WAREHOUSE, etc.—Greater Southwest Corp., c/o Wes Goyer, vice pres., plans by Hedrick & Stanley, 1200 T&P Bldg., Fort Worth, 1 story, 180,000 sq. ft. floor space warehouse and 85,000 sq. ft. office for Container Corp. of America, **$900,000.** CD 5/3.

Tex., Conroe—PLANT—Borden Metal Products Co., c/o A. H. Borden, Montgomery Chamber of Commerce, Montgomery, foundry-type plant for manufacture floor gratings, **$500,000.**

▲ **Tex., Dallas**—GARAGE, etc.—Curtis Sanford, 1712 Cedar Springs, 3 story office-garage, 2818 Maple St., **$500,000.** Jacob E. Anderson, c/o Thomas Bldg., consult. engr. CD 2/4.

▲ **Tex., Lubbock**—SLAUGHTER FACILITIES, etc.—Lewter, Inc. of Lubbock, Slaton Hy., plans by Hedrick & Stanley, 1200 T&P Bldg., Fort Worth, slaughter facilities and cooler bldg. for Supreme Beef Co. **$1,500,000.**

▲ **Tex., Orange**—PLANT—Crown Zellerbach Corp., 485 Lexington Ave., New York, N.Y., plant to produce Polyethylene for packaging, **$5,000,000.**

▲ **Tex., Orange**—PLANT—Ludlow Papers, Inc., c/o Spencer Chemical Co., Orange, plastics processing plant, **$5,000,000.**

▲ **Wash., Tacoma**—PLANT—Ideal Cement Co., Denver National Bank, Denver, Colo., terminal facilities and manufacturing plant. **$18,000,000.**

Alta., Calgary—CAR PARK—Calgary Downtown Parking Corp., 3rd Floor, 803 Centre St. S., plans by L. E. Baker of Strong Lamb & Nelson, consult. engrs., 504-4th St. SE., Car Park, NW corner of 9th Ave. and Center St. **$730,000.**

▲ **Que., Montreal**—WAREHOUSE BLDGS., etc.—Ciba Co. Ltd., Pharmaceutical Products, 1235 McGill College Ave., laboratory administration and warehouse bldgs., Metropolitan Blvd. **$1,500,000.** T. Pringle & Son Ltd., (Percy Booth, archt.) 4795 St. Catherine St. W., consult. engrs.

▲ **Que., Montreal (Mount Royal)**—PLANT, etc.—Kraft Foods Ltd., 8600 Devonshire Rd., Montreal, plant addn. and alterations at present site. **$1,500,000.**

Sask., Regina—FACTORY—Martin Paper Products Ltd., 54 Haultain Crescent, factory for manufacture of corrugated containers. **$800,000.**

Sask., Regina—PLANT—Miracle Bldgs. Ltd., Tuxedo Park, Regina, plant to produce multipurpose metal bldgs. for farm, industrial, commercial, warehouse and recreational use. **$500,000.**

▲ **Sask., Regina**—REFINERY—Imperial Oil Ltd., 500 Winnipeg St., refinery expansion. **$3,000,000.**

UNCLASSIFIED

Mo., St. Louis—PARK DEVELOPMENT—City, Frank Kriz, pres. Bd. P. Service, 304 City Hall, 12th Blvd. and Market Sts., Zone 3, plans by Stuart M. Mertz and Layton, Layton & Rodes, Associated Landscape Archts., 1221 Locust St., Zone 3, development of Plaza Park in three block area between area 15.18 Chestnut and Market Sts. incl. landscaping, walkways, sitting areas, etc. **$843,000.** CD 5/31/55.

Mo., St. Louis—STREET LIGHTING—City, Frank Kirz, pres. Bd. P. Service, 304 City Hall, 12th Blvd. and Market Sts., Zone 3, street lighting sys. for proposed Mark Twain Expressway FAI Rte. No. 1 between Davison Ave. and Destrehan St. **$565,000.** Sverdrup & Parcel; Inc., 915 Olive St., Zone 1, consult. engr. CD 5/31/55.

N. J., Newark—PARK—Essex County Park Comn., Court House, 1,255 acre park, West Essex Park, from Bloomfield Ave., Caldwell, to South Orange Ave., Livingston, on East bank of Passaic. **$500,000.**

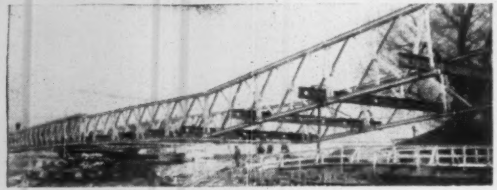
▲ **New York**—PARK IMPRVS.—Niagara Frontier State Park Comn., New York State, 320 Riverway, Niagara Falls, plans by Clarke & Rapuano, 145 E. 32 St., New York, N. Y., elevator from Falls side park level to base of American Falls, Niagara Falls. **$800,000.** Emil H. Praeger, 126 E. 38th St., New York, engr., CD 6/25/44; state park on Lake Ontario, near Fort Niagara, **$500,000.**

▲ **N. Y., Tonowanda**—SWIMMING POOLS, etc.—Town, Town Hall, 2 swimming pools, 2 wading pools, 1-9 hole golf course, 2 artificial ice skating rinks, 1 replacement of Sheridan Park golf course clubhouse, misc. soft and baseball diamonds. **$1,850,000.**

▲ **Wash., Vancouver**—HUDSON BAY FORT—National Park Service, C St. between 18 and 19 Sts., N.W., Wash., D. C., reconstr. Hudson Bay Fort, involving log stockade and 20 bldgs. **$1,500,000.**

A BRIDGE IN TIME...

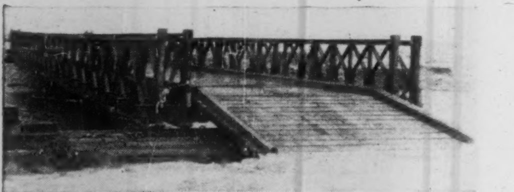
● Bailey bridge units being assembled by unskilled labour.



● Launching a Bailey bridge with a simple launching system which cuts equipment costs.

... prevents blockage of highways

and allows vital road communications to remain open to traffic throughout the year. The Bailey bridge is invaluable also as an access bridge in the opening up of new territory and as a permanent structure.



● Completed emergency bridge replaces old bridge carried away by flooding.

BAILEY BRIDGING

Construction is speeded under all conditions with the versatile Bailey Bridge. Special features include:

- **Practically 100% salvageable**
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- **Deck-type or Thru-Truss construction**
- **Chord-reinforcement for increased capacity without relative increase in weight.**

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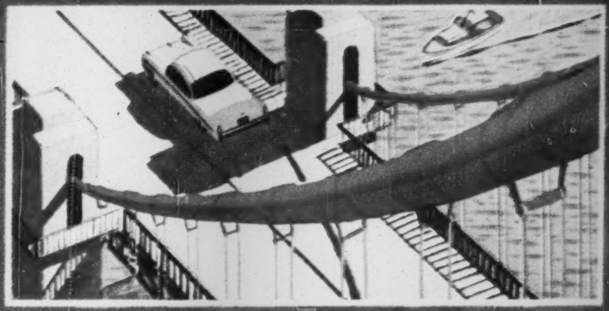
THOS. STOREY (ENGINEERS) LTD., STOCKPORT, ENGLAND

Dark Green **Gray**

Light Green **Name your own tint**

Never before weather-resisting tinted *finishes* that are also rust inhibitive . . .

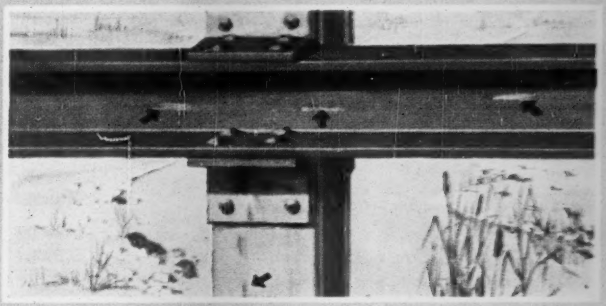


Now you can give steel structures distinctive color . . . or decorative color . . . along with greater durability than ever

Maroon **Gray**

Buff **Name your own tint**

Never before tinted *intermediates* that are *both* weather resistant and rust inhibitive . . .

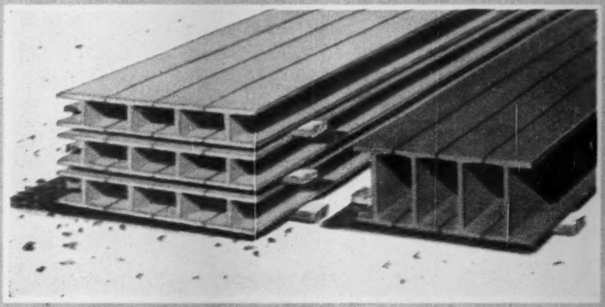


Now you can specify intermediate colors in sharp contrast and aid visual inspection for "holidays"

Orange

Maroon **Name your own tint**

Never before anti-corrosive *primers* that are also tintable and weather resistant.



Now you can eliminate on-the-job mix-ups by using structurals shop-primed in *coded* M50 pigment colors

Proof M50 pigment Defense in Depth paints deliver color opportunities entirely beyond those of ordinary anti-corrosive paints

Wide color choice has never before been available in *all* coats of anti-corrosive specification paint systems. Now *M50* basic lead silico chromate pigment* gives you an entirely new color specification freedom . . . in primers as well as intermediates and finishes . . . along with all-coat rust inhibition, all-coat weather resistance. Some of the opportunities this presents are suggested above. You'll think of others.

M50
Defense
in
Depth

. . . And never before such *durable* color. See next page for proof . . .

*Registered trademark of

National Lead Company

General Offices: 111 Broadway, New York 6, N. Y.

For more facts, turn page

A. No visible discoloration from atmospheric conditions

Contrast areas marked **A** in photo (top at right) of paint test panels exposed 18 months. You can see *M50* pigment paint is free of discoloration caused by atmospheric conditions.

B. No objectionable whitening from normal chalking

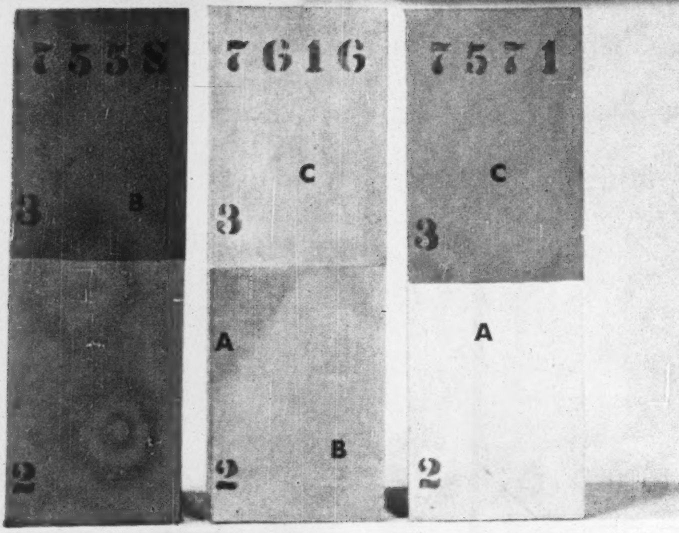
Now compare areas marked **B**. Notice the brightness of color in the *M50* pigment paint. A finger drawn across this paint shows no mark from rubbed off chalk.

C. No noticeable leaching from water action

Look closely at areas marked **C**. Can you see where the non-*M50* paint has been leached by rain water to expose vertical brushmarks in the undercoat? Insoluble *M50* pigment prevents this film failure.

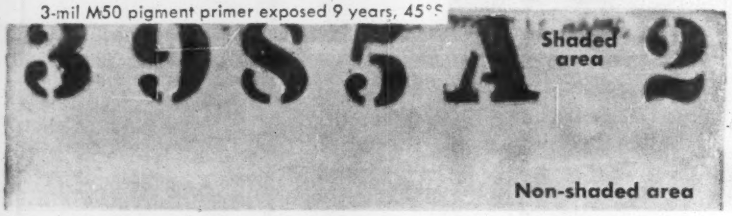
D. No excessive fading from light action

This time examine the close-up (bottom photo at right) of a 9-year *M50* pigment primer exposure test. Contrast between the area shaded by a wooden panel holder and the non-shaded area shows excellent tint retention conferred by *M50* pigment.



Typical M50 pigment paints — Typical standard specification paints — Typical M50 pigment paints

3-mil M50 pigment primer exposed 9 years, 45°S



M50 pigment paint tints stay brighter, retain hue longer ...they're protected against all 4 causes of color loss

No need to amplify what the illustrations on this and the preceding page show. Plainly, *M50** pigment Defense in Depth paints give you more color freedom, more color durability than ever before available in metal protection paints. More rust inhibition, more weather resistance, too. In every coat!

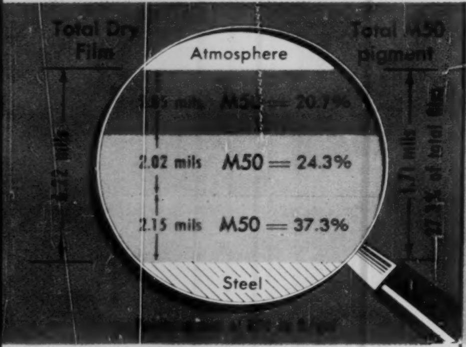
Where to get M50 pigment Defense in Depth paints

National Lead makes the pigment, not the paints. So the place to go for *M50* pigment specification paints themselves is your regular supplier. However, National Lead can help you familiarize yourself with these new paints in four ways: (1) show you *M50* pigment paint exposure test panels at its Sayville, L. I. Test Station; (2) send you a 24-page descriptive brochure, "Defense in Depth." (Mail coupon below); (3) provide technical aid in test applications; (4) help you develop suitable specifications for paints containing *M50* pigment.

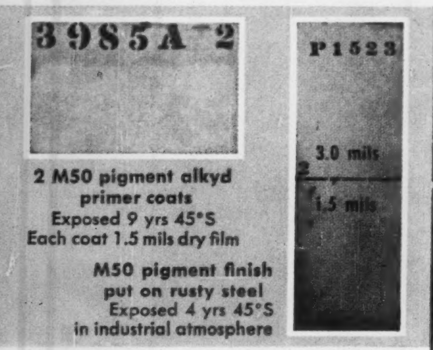
For M50 pigment paints themselves, contact your regular suppliers.

*National Lead Company trademark for a basic lead silico chromate pigment

Why M50 Defense in Depth paints give you metal protection beyond all former concepts



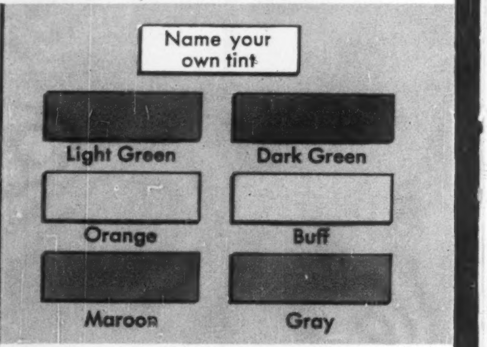
In every coat...rust inhibition! Fused lead chromate is noted for rust-inhibition. The *M50* pigment particle structure permits paint makers to include large proportions of lead chromate in all coats of anti-corrosive systems.



2 M50 pigment alkyd primer coats
Exposed 9 yrs 45°S
Each coat 1.5 mils dry film

M50 pigment finish put on rusty steel
Exposed 4 yrs 45°S
in industrial atmosphere

In every coat . . . weather resistance! *M50* pigment is insoluble in water and has the excellent tint retention properties of fused lead chromate. Unlike other rust inhibitors, it actually boosts weather resistance of paints.



In every coat...your choice of colors! *M50* pigment gets along well with most tinting pigments, permits paint makers a wide range of colors...not only in intermediates and finishes but in primer coats as well. Colors stay true.

M50 Defense in Depth

National Lead Company,
111 Broadway, New York 6, N. Y.

Gentlemen: Please send me your 24-page brochure, "Defense in Depth." Include color card of the six *M50* pigment paints you recommend for steel highway structures.

Name ________ Title ________
Firm or Dept ________
Address ________
City ________ State ________

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
June 24 Massachusetts June 25 Rhode Island

BUILDINGS—BA

▲ **Conn., Naugatuck**—SCHOOL—BA 6/30—Town, Town Hall, 2 story, 128,000 sq. ft. steel frame, cinder block, brick facing high school, Rubber Ave. $2,000,000. Extended date. Sherwood, Mills & Smith, 65 Broad St., Stamford. archts. Werner, Jensen & Korst, 641 Summer St., Stamford, engrs. CD 4/22.

BUILDINGS—LB & CA

▲ **Felix Buzzi & Son, Inc.**, 612 South Main St., Torrington, Conn., LB **$2,615,500**, est. $3,500,000 (7 bidders) MINIMUM SECURITY PRISON, incl. admin. bldg.; five housing bldgs., dining hall, gymnasium, school bldgs., chapels and industrial bldgs., ENFIELD, CONN. Bd. Directors Connecticut State Prison, Wethersfield, Conn. Bids June 9, CD 5/12.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
June 24 Maryland June 27 Pennsylvania
July 1 New Jersey
STREETS AND ROADS
June 24, July 1 Maryland June 26, New York
June 27 Pennsylvania July 1 New Jersey

▲ **Pa., Corapolis**—BA 7/8—Municipal Auth. office Edward N. Weaver, secy., Municipal Bldg., Contr. 1, interceptor outfall sewer sewage regulators, force mains and appurtenances, Plans deposit $30; Contr. 2, general constr. pumping stations, sewage treatment plant, roads and appurtenances, Plans deposit $40; Contr. 3, plumbing work in connection with constr. pumping stations and sewage treatment plant, Plans deposit $25; Contr. 4, heating work in connection with constr. pumping stations and sewage treatment plant, Plans deposit $25; Contr. 5, electrical work in connection with constr. pumping stations and sewage treatment plant, Plans deposit $30; Contr. 6, equipment and piping in connection with constr. pumping stations and sewage treatment plant, Plans deposit $40. Gannett, Fleming, Corddry & Carpenter, Inc., 5823 Penn Ave., Pittsburgh, Zone 6, engrs. CD 7/10/52.

HEAVY CONSTRUCTION—LB & CA

▲ **T & T Contg. Corp.**, 4814 Glenwood Rd., Brooklyn, N. Y., LB **$1,784,000**, 48 in. water main in eastside of Cross Bay Blvd. from Sunrise Hy. to Beach Channel Ave., Rockaway, Queens Boro, NEW YORK, N. Y. Dpt. Water Supply Gas & Electricity, Municipal Bldg., New York 7, N. Y. Bids June 9.

▲ **NEW JERSEY**—State Hy. Dpt., Kenneth D. Rice, secy., 1035 Parkway Ave., Trenton,
George M. Brewster & Sons, 275 W. Fort Lee Rd., Bogota, N. J., CA **$6,653,908**, grading, paving and bridges 3.985 mi. Rte. 101, Sect. 2C, from Howard Blvd. (Mount Arlington Rd.) to Rte. 15 (Union Turnpike) Morris Co., Bids May 13, awarded June 3, CD 5/19, under LB.

▲ **Humphries & Harding, Inc.**, 1608 New Hampshire Ave. N.W., Wash., D. C., LB **$2,388,002** (6 bidders) constr. Southwest Freeway Half St. to 2nd St., Federal Aid Proj. 1-03-1(12) WASH., D. C. D. C. Govt., Dpt. Hys., 499 Pa. Ave. N.W., Wash., D. C. Bids June 9. CD 5/19.

BUILDINGS—LB & CA

▲ **John B. Pike & Son, Inc.**, 1 Circle St., Rochester, N. Y., CA Est. **$2,000,000**, MILK PROCESSING PLANT, FULTON, N. Y. Nestle Co., 100 Bloomingdale Rd., White Plains, N. Y.

▲† **J. Lucarelli & Co.**, 22 Orchard St., Jersey City, N. J., CA **$4,844,300**, 300 units Capehart HOUSING, at Stewart Air Force Base. Inv. 30-603-58-87, NEWBURGH, N. Y. Base Procurement Officer, Stewart Air Force Mase, Newburgh, N. Y. Bids June 5. CD 5/20.

▲ **Walter J. Happel & Co.**, 11 Exter Rd., Short Hills, N. J., Own Forces, **$2,000,000**, 100 addnl. HOUSES in 4th and final section of Rutan Estates, Plenge Place, BELLEVILLE, N. J. Louis Steuber, 2092 Morris Ave., Union, N. J., archt.

▲ **Hi-View Homes, Inc.**, 45 Revere Rd., Emerson, N. J., Own Forces, **$4,250,000**, 81 HOMES, Roberts Rd., ENGLEWOOD CLIFFS, N. J. Donald Rigoni, 28-29, 213 St., Bayside, N. Y., archt.

▲ **Jacob Pinales**, 240 West Front St., Plainfield, N. J., Own Forces, **$3,500,000**, 81 HOUSES, Lyons Rd., known as Harrison Brook Estates, Bernards Twp., LYONS, N. J., Daniel C. Washington, R. D., Chatham, N. J., archt.

▲ **Absig Corp.**, U. S. Hy. 9, Iselin, N. J., Own Forces, **$4,000,000**, 13 bldgs., incl. 286 garden apartments and 77 single family HOUSES on 45 acre tract on Plainfield Rd., Oak Tree, Edison Twp., NIXON, N. J., Nathaniel Schwartz, Cambridge Assocs., Rte. 9, Woodbridge, N. J., engrs.

▲ **Mindy Constr. Co.**, Rte. 18, Metuchen, N. J., Own Forces, **$3,000,000**, 132 HOUSES, streets, sidewalks, sewers, at Tara Estates on Ellis Parkway and 3rd Sts., PISCATAWAY (New Brunswick P. O.), N. J.

▲ **Barclay White & Co.**, 3337 Market St., Phila., Pa. CA **$2,500,000**, 2 PRODUCE BLDGS., PHILA., PA. Food Distr. Center, 12 S. 12th St., Phila., Pa. Bids May 23. CD 5/14.

▲ **Madway Engineers & Constructors**, 107 Aberdeen Ave., Wayne, Pa. Separate Contracts. **$5,000,000.** RESIDENTIAL DEVELOPMENT, Conestoga Rd., etc., ROSEMONT, PA.

▲ **Sordoni Constr. Co.**, 45 Owen St., Forty Fort, Pa. LB **$2,687,000.** HOME FOR INFIRM, WILKES-BARRE, PA. Luzerne County Institution Dist., Courthouse, Wilkes-Barre, Pa. Bids May 28. CD 5/15.

▲ **Baltimore Contractors, Inc.**, 711 South Central Ave., Baltimore 2, Md., CA **$1,051,200**, 2 story, 72x173 ft. LIBRARY, Lombard and Green Sts., for University of Maryland BALTIMORE, MD. State, Dpt. P. Imprvs., 506 Park Ave., Baltimore 1, Md. Bids May 22. CD 6/2, under LB.

▲ **George A. Fuller Co.**, Munsey Bldg., Wash., D. C., LB **$1,956,111** (4 bidders) constr. Elizabeth Seton HIGH SCHOOL, BLADENSBURG, MD. Daughters of Charity of St. Vincent de Paul, Emmitsburg, Md. Bids June 11. CD 5/16.

▲† **Standard Constr. Co.**, 1010 Vermont Ave. N. W., Wash., D. C., LB **$2,826,000**, (4 bidders) constr. 200-unit HOUSING, Project DC 123, Stoddard Terrace, located at Ridge Rd., Southeast between Anacostia Ave. and O Sts., WASH., D. C. National Capitol Housing Auth., 1729 New York Ave. N. W., Wash., D. C. Bids June 9. CD 5/5.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
June 25 Louisiana June 26 Tennessee
STREETS AND ROADS
June 25 Louisiana June 26 Tennessee
July 1 West Virginia

▲ **S. C., Charleston**—BANANA PIER, etc.—BA 7/10—S. C. State Ports Auth., 1 Vendue Range, Charleston, 436 ft. x 300 ft. rein.-con. marginal wharf supported on prestressted concrete piling and covered with structural steel frame and galvanized steel siding and roof incl. misc. grading, paving, drainage piping fencing etc., incl. constr. Columbus St. Terminal, consisting of 607x205 ft. transit shed with a loading dock. Plans deposit $500. Lockwood Greene Engineers, Inc., Montgomery Bldg., Spartanburg, S. C. and Palmer & Baker Engineers, Inc., 957 Springhill Ave., Mobile, Ala., engrs. CD 5/3/57.

BUILDINGS—BA

▲ **Va., Norfolk**—PUBLIC SAFETY—BA 8/6—City, Dir. P. Wks., City Hall, 2 story and 8 story public safety bldg. $4,000,000. Vincent G. Kline, 917 Corinthian Ave., Phila., Pa. Oliver & Smith, 333 W. Freemason St., Norfolk, archts. CD 3/31.

HEAVY CONSTRUCTION—LB & CA

▲ **WEST VIRGINIA**—State Road Comn., Charleston, Zone 5, Bids opened 6/10,
W. A. Wilson & Sons Constr. Co., St. Marys, W. Va., LB **$1,876,510**, c. conc. 3.033 mi. Interstate Rte. 81, Section 1 Road, Proj. IN-81-1(3)17, Berkeley Co. CD 5/22.

▲† **Malan Constr Co.**, 2 Park Ave., New York, N. Y., CA **$1,980,000.** roads and utilities, Naval Air Facility (Harvey Point), NBy-15196, Spec. 15196/57, HERTFORD, N. C. Dist. P. Wks., Fifth Naval Dist., Bldg. N-26, Naval Base, Norfolk, Va. Bids May 27. CD 5/29, under LB.

▲ **FLORIDA**—State Rd. Dpt., Office, Room 228, Holland Bldg., Tallahassee,
W. H. Armston Co., Inc., Dunedin, Fla., CA **$2,821,624**, est. $3,000,000, extra heavy embankment rock base with type 1 b. conc. surface course binder course; constr. 292 ft. concrete deck grade separation bridge with aluminum hand-rails on concrete piling; concrete sheet pile bulkhead drainage structure; fencing and incid. items 3.517 mi. between east end of Mid-Bay Bridge and point approx. 3.5 mi. east, Fed. Aid Proj. 1-41-1(10) (1-10410) Job No. 1019-406 and State Job No. 1027-105, SR 400 and 60, Hillsborough Co. Bids Apr. 29. CD 5/5.

▲ **Morrison-Knudsen Co., Inc.**, 319 Broadway, Boise, Idaho and **Moss-Thornton**, Leeds, Ala., CA **$9,500,000**, diversion dam power house substructures, dikes, canals, etc., Weiss Dam on Coosa Dam, ALABAMA, Alabama Power Co., 600 N. 18 St., Birmingham, Ala. Bids May 21. Awarded June 4. CD 5/15.

▲† **Lacoste, Inc.**, Box 21, Mathiston, Miss., LB **$1,609,572** (6 bidders), Proj. 3R1, grading, grav. base course, structure and bridges, etc., Natchez Trace Parkway. Hinds and Claiborne Counties, MISSISSIPPI. Bureau P. Rds., Dpt. Commerce, First National Bank Bldg., Florence, Ala. Bids June 10. CD 5/16.

▲ **KENTUCKY**—Commonwealth of Ky., Dpt. Hys., Frankfort, Bids opened 6/6,
Ky.—**R. B. Tyler Co.**, 1446 Levering St., Louisville, Ky. and **Kelly Contr. Co.**, 317 Wallace Ave., St. Matthews, Ky., LB **$1,885,033** (4 bidders), high type surf. 2.859 mi. The Watterson Expressway from east end of Interchange at Bardstown Rd. extending northeasterly to point approx. 0.25 mi. south US 60, I 05-1(11) (10) (13), Jefferson Co.;
Ky.—**Foley Constr. Co. & Harry D. Foley**, 5050 Orchard St., Cincinnati, O., LB **$5,696,881** (7 bidders), high type surf. on intersecting streets and roads 3.585 mi. The Covington-Lexington Rd. from near Fifth St. in Covington extending southwesterly to approx. 0.25 mi. west US 25 & US 42 in Fort Mitchell, I 02-8(6), Kenton Co., CD 5/15.
Ky.—**Davis & Shelton**, Sandy Hook, Ky. and **Winston Ford Co.**, Prestonsburg, Ky., LB **$1,301,117** (5 bidders) high type surf. 8.92 mi. The Catlettsburg-Kavanaugh-Louisiana Rd. from approx. 1 mi. south jct. US 23 extending southerly to near Kavanaugh, F 537(3) SP 10-85, Boyd Co.;
Ky.—**Corum & Edwards, Inc.**, Madisonville, Ky., LB **$344,247** (2 bidders), high type surf. 3.655 mi. The Princeton-Kuttawa Rd. from point approx. 2 mi. west of west corporate limit of Princeton extending westerly to Lyon Co. line, DF 549, (5) SP 17-182, Caldwell Co.;
Ky.—**Robert Hite**, 510 W. Stephen Foster Ave., Bardstown, Ky. and **Breslin Constr. Co.**, 1433 S. Preston St., Louisville 17, Ky., LB **$178,706** (3 bidders), b. conc. Class I surf. 0.857 mi. Hodgenville-Magnolia (Ky. 698 & US 31-E) Rd. extending northerly to point US-31 E, approx. 0.2 mi. north of north property line of Lincoln National Park, F 10(4) SP 62-321 & SP 62-61, Larue Co.;
Ky.—**Winston Ford Co.**, Prestonsburg, Ky., LB **$523,754** (1 bidder), high type surf. 2.057 mi. DF 506 (6), F 544(4), F 127(23), Pike Co.;
Ky.—**Cantrill Constr. Co.**, 700 N. Broadway, Lexington, Ky., LB **$99,965** (10 bidders), bit. resurf. 12.12 mi. SP Group 39 (1958), Casey and Lincoln Counties;
Ky.—**L. E. Bergin**, 925 Baker St., Covington, Ky., LB **$84,717** (8 bidders), bit. resurf. 15,368 mi. SP Group 40 (1958), Casey Co.;
Ky.—**T. C. Young Constr. Co.**, Williamsburg, Ky., LB **$103,819** (3 bidders), traffic bound surf. 3.39 mi. RS 29-567, RS 86-694, Cumberland and Monroe Counties;
Ky.—**Davis & Shelton Co.**, Sandy Hook, Ky., LB **$106,469** (2 bidders), trafficbound surf. 3.325 mi. RS 58-417, Johnson Co. CD 5/21.

▲ **Traylor Bros.**, Upper Mt. Vernon Rd., Evansville, Ind., CA **$3,337,530**, combination of Contrs. F-226-F and 226-G, Ohio River Interceptor Sewer, LOUISVILLE, KY. Metropolitan Service Comn., 412 W. Market St., Louisville, Ky. Bids May 16. CD 5/21, under LB.

BUILDINGS—LB & CA

▲ **S. J. Curry & Co.**, Box 1436, Albany, Ga., LB **$1,962,835**, Alachua GENERAL HOSPITAL, GAINESVILLE, FLA. Alachua Co. Bd. Trustees, Gainesville, Fla. Bids June 5, CD 5/13.

▲ **Southern Builders, Inc.**, Box 1815, Shreveport, La., LB **$1,680,000** (9 bidders), Iberia Parish HOSPITAL, NEW ERIA, LA. Bd. Comn. of IBERIA Parish Hospital Service Dist. 2, New Iberia, La. Bids June 5. CD 5/5.

▲ **Hargett Constr. Co.**, 113 Walton Ave., Lexington, Ky., LB **$2,104,000** (7 bidders), Power Plant TUNNEL and facilities for University of Kentucky Medical Center, LEXINGTON, KY. Commonwealth of Ky., Div. Purchases, Frankfort, Ky. Bids June 6. CD 5/5.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
June 25 Indiana

▲ **Ill., Chicago**—BA 6/26—City, City Hall, Halsted St. Bridge extension, 2 span steel, concrete West Rte. Superhighway, Proj. I-01-4 (67). $1,800,000. CD 4/9/45.

▲ **Ill., Chicago**—PIER IMPRVS.—BA 7/8—City, City Hall, imprv. Navy Pier, incl. 1,100 ft. long, 96 ft. wide rein.-con. on steel piling pier, with 2 railroad tracks along outer edge, $2,000,000. CD 9/10.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—State Hy. Dpt., 165 Capitol Ave., Columbus,
C. F. Replogle Co., Box 308, Circleville, O., CA **$3,861,860**, est. $4,308,400, 3.6 mi. portion of Columbus-Medina section of Cincinnati-Conneaut Freeway, 7 bridges will be constructed; 2 relocated portion of Ritter Rd.; 5 will be at Mock Rd., Clear Fork Stream, Alexander Rd., B & O R.R. and as part of a diamond type interchange at State Route 97, Proj. SR1-4.96, Richland Co. Bids May 27. CD 6/6, under LB.

▲ **Thompson Constr. Co.**, 3840 Prospect St., Indianapolis, Ind., CA **$1,175,000** North Keystone Ave. sewer, Section D; CA **$610,000**, East Michigan St. storm sewer, Section 3, INDIANAPOLIS, IND., Bd. Sanitary Comrs., 429 N. Penn St., Indianapolis, Ind. CD 4/9, and CD 4/15, respectively.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldg., Springfield,

Hoeffken Bros., Inc., 222 W. B St., Belleville, Ill. CA **$1,523,000.** 2.43 mi. concrete pavement F.A.I. Rte. 7 from approx. ¼ mi. NE of U. S. Rte. 40 NE to approx. ½ mi. west of Ill. Rte. 159, 2 parallel 3 span rein.-con. slab grade separation structures (carrying F.A.I. Rte. 7 over a Twp. Rd.) on F.A.I. Rte. 7 approx. ½ mi. north of Collinsville, a 4 span rein.-con. deck girder grade separation structure (carrying a twp. road over F.A.I. Rte. 7) F.A.I. Rte. 7, approx. 1 mi. north of Collinsville, Madison Co. Bids May 6, Awarded May 28. CD 5/12, under LB.

▲ **Arcole Midwest Corp.**, 3255 Main St., Evanston, Ill., CA **$1,682,638**, 4 grade separations Northwest Expressway, Harlem, Oriole, Canfield and Cumberland Aves., Proj. U-265 (21); CA **$877,029** 3 grade separations, Sayre Ave., Natoma Ave. and E. River Rd., Proj. U-265 (20); CA **$1,030,030**, 2 grade separations, Northwest Expressway, Central and Foster Aves., Proj. U-265 (18); CA **$568,569**, 2 grade separations, Northwest Expressway, Austin and Nagle Aves., Proj. U-265 (19); CA **$955,568**, grade separation over Northwest Expressway, Sect. 267-1112-15D, Proj., BU-265 (15) CHICAGO, ILL. Cook Co., County Bldg., Chicago, Ill. Grand total $5,113,834. Bids May 6. CD 5/12, under LB.

▲ **Kenny Constr. Co.**, 3220 Oakton St., Skokie, Ill. CA **$5,732,281** constr. 740 ft. grade separation to carry tracks of the Milwaukee, Pennsylvania, & North Western R.R. over intersection of Wayman, and Kinzie St. and Northwest Expressway CHICAGO, ILL. City, City Hall, Chicago, Ill. CD 4/8, under LB.

▲ **A. L. Jackson Co.**, 300 W. Wabash St., Chicago, Ill., LB **$14,730,374**, constr. settling basins and outlet control substructure for General District filtration plant, work is located within a cofferdam north of Navy Pier and east of Lake Shore Dr., CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids June 6. CD 5/2.

▲ **MICHIGAN**—State Hy. Dpt., John C. Mackie, hy. comr., Stevens T. Mason Bldg., Lansing, Bids opened 6/4,

Mich.—**Charles J. Rogers, Inc. and Jutton Kelly Co.**, 13240 Albert, Dearborn, Mich. and **Cooke Contg. Co.**, 1116 Penobscot Bldg., Detroit, Mich., LB **$1,769,453**, est. $1,890,000, dual 36 ft. concrete pavement, utility alterations 1.235 mi. and 2 pedestrian bridges Edsel Ford Expressway Whittier to City limits, Detroit, BI 82025 C27 I 09-1 52 BI B93 of 82-22-10 C1-UN I 09-1 52 BI B94 of 82-22-10 C1-UN I 09-1 52 82025 Wayne Co.; LB **$1,663,697**, est. $1,800,000 (11 bidders), concrete paving 1.046 mi. Expressway and Ramps, utility alterations and 4 bridges Edsel Ford Expressway from Outer Dr. to Whittier, Detroit, BI 82025 C-29 UN (I 09-1 35) BI B86 of 82-22-10 C1-UN BI B88 of 82-22-10 C1-UN BI B90, of 82-22-10 BI B91 of 82-22-10 CO-UN I 09-1 35 82025, Wayne Co., LB **$1,343,966**, est. $1,460,000. (15 bidders), grading, drainage structures, utility alterations, surf. service roads and constr. two bridges Edsel Ford Expressway Bedford To Morang, Detroit, BI 82025 C30-UN (I 09-1 44) BI B92 of 82-22-19 C2-UN (I 09-1 28) BI 95 of 82-22 10 C2-UN (I 09-1 29), Wayne Co.;

Mich.—**Sargent Constr. Co.**, 2840 Bay Rd., Saginaw, Mich., LB **$425,118**, est. $470,000 (12 bidders), 24 ft. b. conc. aggreg. base course, 5.828 mi. also bridge on M-142 from M-25 east to Pigeon. M 32021 C2-U M 32021 C3-R M B1 of 32-28-2 C2-R, Huron Co.;

Mich.—**W. H. Knapp Co.**, Monroe, Mich., LB **$431,814**, est. $420,000 25 ft. aggreg. base course, prime and double seal 5.151 mi. M-211 from State St. in Onoway north, SS 71031 C1-U (S 76 4) SS 71031 C2-R (S 76 4), Presque Isle Co.;

Mich.—**W. J. Storen Co.**, 2411 14th St., Detroit, Mich., LB **$437,349**, est. $590,000 (11 bidders), storm water pumping stations and regulator Outer Dr. and Cadieux, Whittier and Marsailes on Edsel Ford Expressway, Detroit, BI D18 B1 19 of 82-22 C1-UN BI D40 BI E 10 of 82-22 C1-UN BI D19 of 82-72 C1-UN BI D41 of 82-22 C1 UN I 09-1 36 82025, Wayne Co. CD 5/19.

BUILDINGS—LB & CA

▲ **A. Visconsi & Sons**, 6865 Pearl Rd., Cleveland 30, O., Own Forces. **$2,500,000**, SHOPPING CENTER, Westgate subdivision, TIFFIN, O. Rudolph J. Grosel, The Arcade, Cleveland 14, O., archt. CD 1/17/57.

▲ **H. G. Christman Constr. Co.**, 850 Fellows St., South Bend, Ind., LB **$2,978,529**, Washington HIGH SCHOOL, GYMNASIUM, AUDITORIUM and swimming pool, West side of SOUTH BEND, IND., School City of South Bend, 228 S. St. Joseph St., South Bend, Ind., Bids May 26. CD 4/29.

▲ **George Sollitt Constr. Co.**, 109 N. Dearborn St., Chicago, Ill., CA **$1,647,835**, 1 story, brick, stone MEDICAL RESEARCH BLDG., bit. and concrete paving, sidewalks, curbs, gutters, incinerators—S. Parking Lot, W. Taylor and Wolcott St., CHICAGO, ILL. University of Illinois, 1716 W. Taylor St., Chicago, Ill. CD 5/20, under LB.

▲ **Mercury Builders**, 761 S. Harlem Ave., Forest Park, Ill., LB **$3,455,055**, 3 MOTOR VEHICLE ADMINISTRATION BUILDINGS (N W & S Bldgs.) bit. paving, Congress Expressway and Central Ave.; Elston and Latrobe Ave., and 99 St. and South Park Ave., CHICAGO, ILL. State of Illinois, Dpt. P. Wks. & Bldg., Centennial Bldg., Springfield, Ill. CD 3/11, under Unclassified.

▲ **Fruin-Colnon Contg. Co.**, 1706 Olive St., St. Louis, Mo. and **S. M. Wilson & Co.**, 1616 Cleveland Ave., Granite City, Ill. (joint venture) CA Total Est. over **$2,000,000**, general contract 5 story, part bsmnt., 52 x 200 ft. section to house OFFICES, and 1 story, bsmnt. 62 x 190 ft. wing to be used by BANK, Edison Ave to State St. on 20th St., in GRANITE CITY, ILL. Granite City Steel Co., Nicholas P. Beeder, chn. Bd., 20th and Madison Ave., Granite City, Ill. Sverdrup & Parcel, Inc., 915 Olive St., St. Louis 1; Mo. engr. Awarded June 4.

▲ **Medema Builders, Inc.**, 9100 Trumbull St., Evergreen Park, Ill., Own Forces. **$15,000,000**, 600 HOMES, 147 and Central Sts., OAK FOREST, ILL. R. Donald Jaye, 210 E. Ohio St., Chicago, Ill., archt.

▲ **J. H. Findorff & Son**, 601 W. Wilson St., Madison, Wis., LB **$1,797,000**, general contract 3 DORMITORY bldgs., MADISON, WIS., Wisconsin University Bldg. Corp., Madison, Wis. Bids May 29. CD 5/6.

▲ **Beckering Constr. Co.**, 2140 Horton St. S. E., Grand Rapids, Mich., CA **$2,081,000**, PLANT, Walker Rd., GRAND RAPIDS, MICH. Bissell Carpet Sweeper Co., 210 Erie N.W., Grand Rapids, Mich. Bids May 23. CD 6/5, under LB.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

June 19 Wyoming June 24, Iowa, Missouri
June 27 Minnesota, North Dakota

STREETS AND ROADS

June 19 Wyoming June 24 Iowa
June 26 Missouri June 27 Minnesota, Nort Dakota

▲† **Missouri**—BA 7/17—U. S. Eng., P.O. Box 867, Little Rock, Ark., clearing Table Rock Reservoir, Branson. $1,000,000-$3,000,000. CD 9/5.

BUILDINGS—BA

▲ **Colo., Englewood**—SCHOOL—BA 7/3—Arapahoe County School Dist. No. 1, Englewood, high school addn. $1,500,000, Wheeler & Lewis, 2215 W. 32nd Ave., Denver, archts. Perkins & Will, 309 W. Jackson Blvd., Chicago, Ill., engrs. CD 3/29/57.

▲† **Minn., Fort Snelling**—RESEARCH LABORATORIES—BA 7/9—U. S. Govt., Bureau Mines, Contracting Officer, 2908 Colfax Ave. South, Minneapolis, 4 story, 72,000 sq. ft. research laboratory in Fort Snelling area. $1,718,000. Plans deposit $100. Bettenburg, Townsend, Stolte & Comb, 1437 Marshall Ave., St. Paul, archts. CD 10/16.

HEAVY CONSTRUCTION—LB & CA

▲ **TEXAS**—State Hy. Comn., Austin, Bids opened 6/10.

Tex.—**R. N. Adams**, P. O. Box 581; Kaufman, Tex. LB **$1,180,282** grading, structures and stabilization 5.401 mi. Hy. IH 45 Proj. I 45-2 (2) 108, Walker Co. CD 6/2; LB **$232,810** grading, etc. 11.448 mi. Hy. FM 2514. Proj. R 2400-1-1, Robertson Co. CD 5/21.

Tex.—**R. W. McKinney**, P. O. Box 190, Nacogdoches, Tex., LB **$226,788** grading, and structures, 9.238 mi. Hy. FM 2321. Proj. S 2232 (1) Grayson Co. CD 5/21; LB **$215,536** grading, etc. 8.513 mi. Hy. FM 356, Proj. S 668 (3) Polk and Trinity Counties. CD 5/21;

Tex.—**Ivan Dement & Austin Bridge Co.**, P. O. Box 1787, Amarillo, Tex. LB **$1,315,771** grading, etc. 8.282 mi. Hy. US 60 and 87. Proj. F 60 (14) Randall Co.; LB **$624,746** grading, etc. 7.027 mi. Hy. SH 152. Proj. DF 720 (12) and DF 720 (13) Hutchison Co. CD 6/2;

Tex.—**Texas Bitulithic Co.**, P. O. Box 10365, Dallas, Tex. LB **$2,912,705** c. conc. etc. 9.881 mi. Hy. IH 45. Proj. I 45-3 (13) 250 and F 569, Ellis Co.;

Tex.—**Spencer Constr. Co., Inc.**, P. O. Box 487, Carrollton, Tex. LB **$469,147** grading, structures, etc. 5.863 mi. Hy. US 96, Proj. F 30 (9) Jasper Co.;

Tex.—**A. K. Gillis & Sons & W. R. Boyd**, 115 Fore St., Sulpher Springs, Tex. LB **$506,590** grading, etc. 11.934 mi. Hy. US 79. Proj. F 456 (6) Panola Co., all foregoing CD 6/2;

Tex.—**Trotti & Thompson, Inc.**, P.O. Box 70, Beaumont, Tex. LB **$518,678** grading, etc. 8.465 mi. Hy. US 90 and FM 365, Proj. DF 352 (3) Liberty and Jefferson Counties;

Tex.—**F & C Engineering Co.**, P. O. Box 2426, Houston Tex. LB **$1,247,742** grading, structures, etc. 3.06 mi. Hy. IH 10. Proj. I 149 (15) Orange Co., all foregoing CD 5/26.

▲† **Nelse Mortensen & Co., Inc.**, 1021 Westlake Ave., North Seattle, Wash. LB **$2,492,757** (6 bidders) constr. dormitory and other bldgs. at Glasgow Air Force Base, ENG-45-164-58-60, GLASGOW, MONT. U. S. Eng., City-County Airport, Walla Walla, Wash. Bids June 10. CD 5/7.

▲† **The Bay Co.**, 1512 Center St., Tacoma, Wash. LB **$1,409,730**, est. $1,303,934 on-base utilities incl. exten. high temperature water sys., constr. jet-fuel hydrant sys. and general utilities at Glasgow Air Force Base, Inv. 58-61, GLASGOW, MONT. U. S. Eng., City-County Airport, Walla Walla, Wash. Bids June 10. CD 5/2.

BUILDINGS—LB & CA

▲ **Rob. E. McKee, General Contractor, Inc.**, Box 2848, Dallas 9, Tex. LB **$6,748,000.** est. $2,000,000-$3,500,000 201,844 gross sq. ft. addns. and alterations to BANK, DALLAS, TEX. Federal Reserve Bank, c/o Earl B. Austin, 400 S. Akard St., Dallas, Tex. Bids May 27. CD 5/21.

▲† **J. W. Bateson Constr. Co.**, P. O. Box 13307, Walnut Hill Station, Dallas, Tex. CA **$5,763,700**, 366 family HOUSING units, Connally Air Force Base, Inv. 41-611-58-51, WACO, TEX. Procurement Officer, Connally Air Force Base, Waco, Tex. Bids May 29. CD 5/20.

▲ **C. H. Leavell & Co.**, 1900 Wyoming, El Paso, Tex., CA **$6,859,000**, constr. 4 story, 490,000 sq. ft. POSTAL ANNEX BLDG. (lease-project) DENVER, COLO. U. S. Post Office Dpt., General Services Admin., 19th and F Sts. N.W., Wash., D. C. Bids May 27. CD 6/2, under LB.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

July 1 Idaho July 2, 9 California

STREETS AND ROADS

July 2, 3, 9, 10, 16 California

▲ **Calif., Los Angeles**—BA 7/1—Metropolitan Water Dist. of Southern California, 306 W. 3 St., constr. 19.6 mi. concrete lined canals box siphons and appurtenant works for Colorado River Aqueduct and 2nd San Diego Aqueduct in the San Jacinto Valley to Auld Valley, Spec. 554. $9,000,000.

BUILDINGS—BA

▲ **Calif., Torrance**—SCHOOL—BA 7/3—Torrance Unif. School Dist., constr. 3 increment addns. to South High School, $1,600,000. CD 6/14/55.

HEAVY CONSTRUCTION—LB & CA

▲ **IDAHO**—State Hy. Dpt., Boise,

Eagle Constr. Co., 3200 Pleasanton Ave., Boise, Idaho, CA **$1,648,885**, grading, drainage on 4-lane divided roadway on 20.751 mi., 26.33 ft. concrete overpass and 51.75 ft. concrete bridge on Interstate Hy. 82 and 82 N, Cassia Co. Bids May 27, awarded May 29. CD 6/3, under LB.

▲† **Arch Dam Constr. Co.**, 1024 Omaha National Bank, Omaha, Neb. (Peter Kiewit Sons Co., Morrison-Knudsen Co. Inc., Mid-Valley Utilities Constructors Inc. and Coker Constr. Co.) LB **$29,602,497** (7 bidders) constr. Flaming Gorge Dam and power plant on Green River, Northern Utah, Colorado River Storage Proj. approx. 45 mi. north of Vernal, in Dagget Co., UTAH. Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, Colo. Bids June 10. CD 4/25.

▲† **Christiansen Bros.**, Box 1925, Salt Lake City, Utah. LB **$2,312,935** erection air tanks at Marquardt Jet Laboratory, for Air Force, Spec. MJL-599-5, OGDEN, UTAH. Marquardt Aircraft Co., 7735 Kester Ave., Van Nuys, Calif. Bids May 26. CD 5/6.

▲† **Peter Kiewit Sons Co.**, P.O. Box 177, Vancouver, Wash., CA **$1,684,391**, operational apron and fuel facilities, McChord Air Force Base, Contr. DA-45-108, ENG-45-198-58-117, TACOMA, WASH., U.S. Eng., 4735 E. Marginal Way, Seattle 4, Wash., Bids May 7, CD 5/15, under LB.

▲† **Garrett & Shafer Engineering Works**, 322 1st St., Seattle, Wash. LB **$2,057,542** (9 bidders) furnishing one 16 ft. dia. steel penstock with branch outlet pipes, est. weight 6,800,000 lbs. for Trinity Dam, Central Valley Proj., Inv. DS-5049, CALIFORNIA. Bureau Reclamation, Dpt. Interior, Denver, Federal Center, Denver, Colo. Bids June 5. CD 5/8.

▲ **Kemper Constr. Co. and McDonald & Kruse**, 3701 Overland Ave., Los Angeles, Calif. LB **$1,777,806** constr. covered concrete conduit for Sycamore-School Diversion from Chevy Chase Dr. to Verdugo Rd., Glendale, LOS ANGELES, CALIF. Los Angeles Co. Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. Bids June 6. CD 5/7.

▲ **R. A. Watson Co.**, 12555 Saticoy St., P.O. Box 679, North Hollywood, Calif. CA **$2,465,220** constr. Arroyo de la Sacatela Storm drain, Bond Issue Proj. No. 57, Unit 1, LOS ANGELES, CALIF. Los Angeles Co. Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. Bids May 23, awarded June 4. CD 5/27, under LB.

▲† **Gordon H. Ball**, 300 Camille Ave., Danville, Calif. CA **$1,824,700** exten. runway approach lighting and optical landing sys. for Runway 24L and 24R at Naval Air Station, MIRAMAR, CALIF. Eleventh Naval Dist., 1220 Pacific Hy., San Diego, Calif. Bids May 23, awarded May 29. CD 5/29, under LB.

BUILDINGS—LB & CA

▲† **Rosendahl Corp.**, 11933 Wilshire Blvd., Los Angeles, Calif. CA **$2,517,000.** (7 bidders) TEST CELL BUILDING, BOILER PLANT, water treatment plant and related work at Airforce-Marquardt Jet Laboratory, for Dpt. Air Force, Spec. MIL500-5, OGDEN, UTAH. Marquardt Aircraft Co., 7735 Kester Ave., Van Nuys, Calif. Bids June 9. CD 4/29.

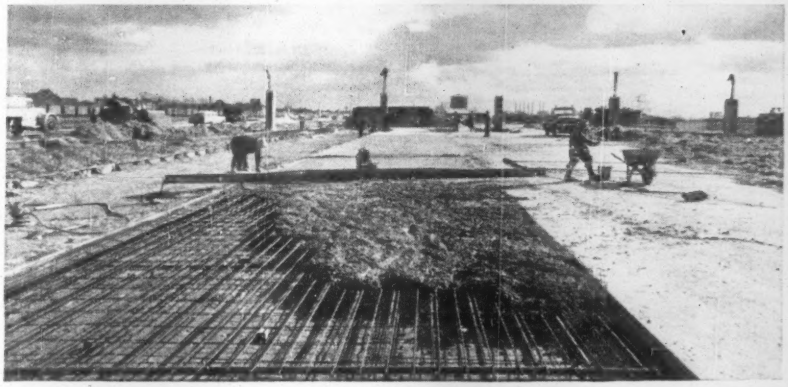
▲ **L. W. Johnson**, 1266 Mercer St., Seattle, Wash., and **Morrison-Knudsen Co., Inc.**, 319 Broadway, Boise, Idaho, CA **$2,945,435**, 5 story, bsmnt. LIBRARY, SEATTLE, WASH., Seattle Library Bd., Electric Bldg., Seattle 1, Wash., Bids June 3, CD 6/6, under LB.

▲† **G. A. Fuller Co. & Murray-Sanders**, 3100 West 8th St., Los Angeles, Calif., LB **$7,760,625**, (8 bidders) 600 units Capehart family HOUSING, at McChord Air Force Base, Inv. 58-72, TACOMA, WASH., Procurement Office, McChord Air Force Base, Wash., Bids June 10, CD 5/15.

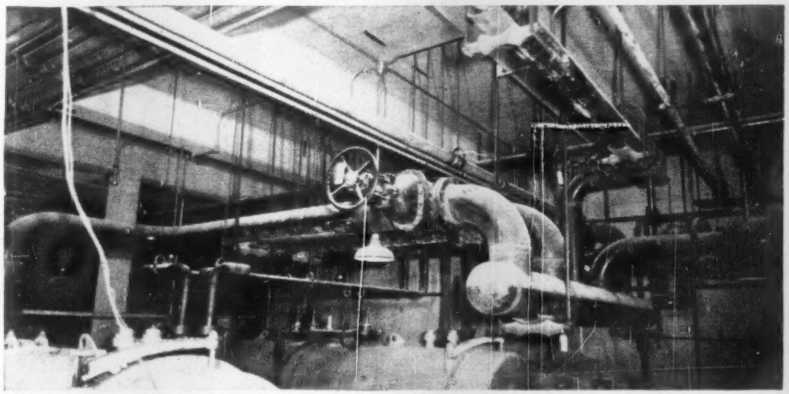
(Continued on page 216)

USS **National Pipe** used exclusively for snow-melting system on Chicago's Calumet Skyway

Welding together National Steel Pipe sections at the 22-lane toll plaza area, Calumet Skyway, Chicago. The plaza area is equipped with a snow-melting system to reduce winter stopping and starting hazards due to snow and ice.



Embedding the steel pipe grids in concrete. A total of 76,192 feet of National Steel Pipe in sizes of ¾″ and 1¼″ were used to form the grids of the vast Calumet Skyway snow-melting system



Under the toll plaza areas, too, boilers supply the heat, through heat exchangers, to the circulating anti-freeze. National Pipe was used exclusively on this application utilizing 2,211 feet of USS National Seamless Steel Pipe.

USS and National are registered trademarks

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National Tube
Division of USS **United States Steel**

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CURB and GUTTER
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Smith-Field Automatic Curb and Gutter Machine in operation.

at LESS COST

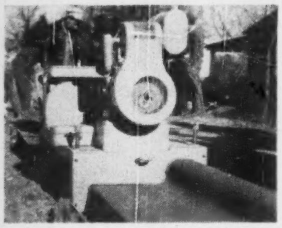
NO HAND FINISHING!
NO FORMS!

Lay up to 1,200 feet of integral curb and gutter per day — with no forms or hand finishing. The Smith-Field Automatic Curb and Gutter Machine is doing just that for cities, contractors, builders over the world. Savings of time, labor and material mean money on any job anywhere. The Companion machine — Stephens-Canfield Automatic Curber — lays curbing with the same dispatch, reaching as high as 3,000 feet per day.

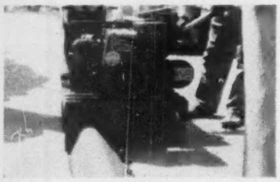
The Smith-Field Automatic Curb and Gutter Machine uses Portland Cement Concrete. The Stephens-Canfield Automatic Curbers work equally well with either cement or asphalt mix.

TYPICAL MOLD SECTIONS—65 OTHERS AVAILABLE

LEARN about the savings — the efficiency of these machines. Write for full details and prices.



Smith-Field Automatic Curb and Gutter Machine — Model Mark 3



Stephens-Canfield Automatic Offset Curber — Model 56W

Stephens-Canfield Automatic Curber — Model 55A

E. L. HARDIN ASSOCIATES, INC.
SALISBURY, NORTH CAROLINA U. S. A.

SOLE MANUFACTURERS AND DISTRIBUTORS—U.S.A. AND FOREIGN
PATENT NOS. 2.707.422—2.818.790—AND OTHER PATENTS PENDING

3303

(Continued from page 214)

▲† **Sun Gold, Inc., L. E., Dixon Co. & American Pipe Co.**, 3631 10th St., Riverside, Calif. LB **$7,894,210** (8 bidders) 540 capehart FAMILY HOUSING units at McClellan Air Force Base, SMPPCA, SACRAMENTO, CALIF. Directorate of Procurement & Production, Bldg. 10, McClellan Air Force Base, Sacramento, Calif. Bids June 10. CD 5/14.

▲† **D&L Constr. Co. & J. D. Bradley, Inc.**, 13238 Sherman Way, North Hollywood, Calif. CA **$3,421,300** joint venture. 220 family HOUSING units, Armed Services Housing (Capehart) Mather Air Force Base, ENG-04-612-58-26 SACRAMENTO, CALIF. Base Procurement Office, Bldg. 2554, Mather Air Force Base, Sacramento, Calif. Bids May 22. CD 5/26, under LB.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
June 25, July 9 Ontario June 26 British Columbia

HEAVY CONSTRUCTION—LB & CA

▲ BRITISH COLUMBIA—Dpt. P. Wks., Hunter Bldgs., Ottawa, Ont., Bids opened 6/5,
Square M. Constr. Ltd., 10325-61st Ave. and **Coleman Colliers Ltd.**, both of Edmonton, Alta., (joint venture) LB **$1,989,906**, grading, culverts, Mile 0 to Mile 6, Trans-Canada Hy., Glacier National Park, Glacier. CD 5/22.

▲ BRITISH COLUMBIA—B. C. Govt., Parliament Bldgs., Victoria,
Mannix Ltd., 546 Howe St., Vancouver, B. C., CA **$1,796,441**, constr. Revelstoke Park, Glacier Park section of Trans-Canada Highway, Proj. No. 902, Revelstoke-Park-Glacier Park. Bids May 8, Awarded June 4. CD 4/29.

▲ BRITISH COLUMBIA—B. C. Govt., Parliament Bldgs., Victoria, Bids opened 5/21,
A. I. M. Steel Ltd., Annacis Industrial Estate, B. C., LB **$2,163,512** (4 bidders) fabrication and erection steel superstructure for Alexandria Bridge at Mile 192.74 on Trans-Canada Highway in Yale Electoral Dist., near Yale. CD 4/29.

▲ NORTHWEST TERRITORIES—Dpt. P. Wks., Hunter Bldg., Ottawa,
Mannix Ltd., 737-8th Ave., W., Calgary, Alta., CA **$1,876,216** (19 bidders) grading, culverts and crushed rock surfacing from Mile 20 to Mile 58, Yellowknife to Fort Rae development Rd., Yellowknife, Bids Apr. 10, CD 4/21.

BUILDINGS—LB & CA

▲ **Commonwealth Constr. Co. Ltd.**, 700 Taylor St., Vancouver, B. C., CA **$3,000,000**, 14 story, 125 x 300 ft., rein. conc., with facilities for about 100 doctors, MEDICAL BLDG., southeast corner Broadway and Willow, VANCOUVER, B. C. General Medical Bldg. Ltd., c/o 1930 Marine Blvd., Vancouver, B. C. Awarded June 5, CD 3/30/55.

▲ **Peter Leitch Constr. Ltd.**, 170 Scott St., Winnipeg, Man., CA Est. **$3,000,000**, Polo Park SHOPPING CENTRE, WINNIPEG, MAN. Winnipeg Syndicate, c/o David Slater Ltd., 806 Childs Bldg., Winnipeg, Man. Awarded June 2. CD 12/14/55.

▲ **Pigott Constr. Co. Ltd.**, 1250 Bay St., Toronto, Ont., CA Est. **$2,000,000**, 1 and 2 story, 300 x 600 ft. on one level, 300 x 300 ft. on lower grade, structural steel frame, masonry walls, aluminum sash, steel roof deck ADMINISTRATION BLDG., Downsview, TORONTO, ONT. Ontario Dpt. Hys., Parliament Bldgs., Toronto, Ont. Bids Apr. 30, awarded June 4. CD 3/31.

ALASKA

HEAVY CONSTRUCTION—LB & CA

▲† **B-E-C-K & Assocs.**, 3647 Stone Way, Seattle, Wash. CA **$3,020,331**, est. $3,295,805, constr. Nike Guided Missile installation involving 5 large frame and or concrete structures with utilities, roads, etc., Inv. 58-36, LADD AIR FORCE BASE, ALASKA, U. S. Eng., 1519 S. Alaskan Way, Seattle, Wash. Bids May 29. CD 6/4, under LB.

LATIN AMERICA

HEAVY CONSTRUCTION—LB & CA

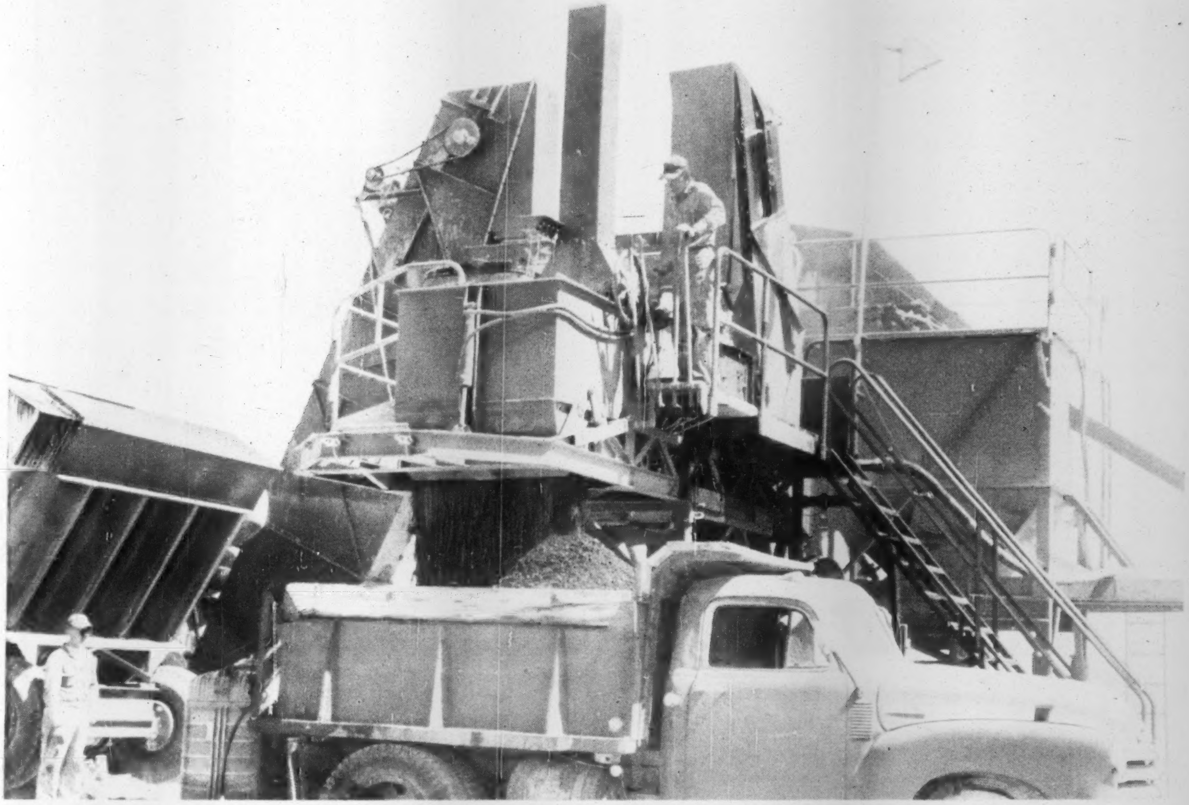
▲ **Williams Bros. Sud Americana**, National Bank of Tulsa, Tulsa, Okla., U. S. A. CA Est. **$5,050,000.** 101 mi. 30- to 34-in. heated oil pipe line from Bachaquero Field to Puerto Miranda, VENEZUELA Cia Shell de Venezuela, Puerto Miranda, Venezuela.

PUERTO RICO

HEAVY CONSTRUCTION—LB & CA

▲† **Nolla, Galib & Cia**, Box 2423, San Juan, P. R., LB **$1,610,400.** B.O.O. with mess, EM Subsistence Bldg., Naval Station, NBy-10131, Spec. 10131/58, ROOSEVELT ROADS, PUERTO RICO. Area Public Works Office, Caribbean, Naval Station, San Juan, P. R. Gullermety & Ortiz, Inc., San Juan, P. R., archt.-engr. Bids May 29.

(Proposal Advertisement see pp. 231 to 233)



NEWEST IN HIGH-CAPACITY PLANTS. The new Models 847 and 848-A offer greater flexibility than ever before available in high-capacity plants. Model 845 (not illustrated) offers mixer and gradation unit on same chassis for the last word in portability.

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"saved us $12,500"

says **Albert O. Wilson, Jr.,** President,
A. O. Wilson Structural Company,
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"We consider U. S. Steel Supply's pre-cutting service a valuable asset. For instance, on one contract last year this service sliced our labor costs 5%, or in terms of hard cash, $12,500, by maintaining production schedules."

Perhaps U. S. Steel Supply's Any Steel, Anywhere, Any Time Service can help you maintain a more efficient construction schedule. One of our representatives will be glad to show you how it works. For more information, write to U. S. Steel Supply at the address below.

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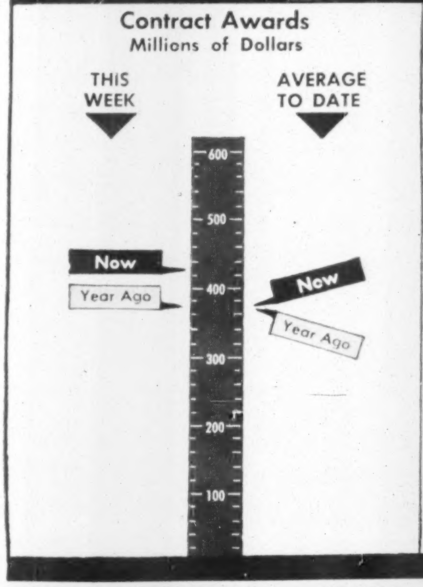
Steel Service Centers Coast to Coast • Mailing Address: P. O. Box 1099, Dept. M6, Chicago 90, Ill. • General Offices: 208 So. La Salle St., Chicago 4, Ill.

Construction Scoreboard

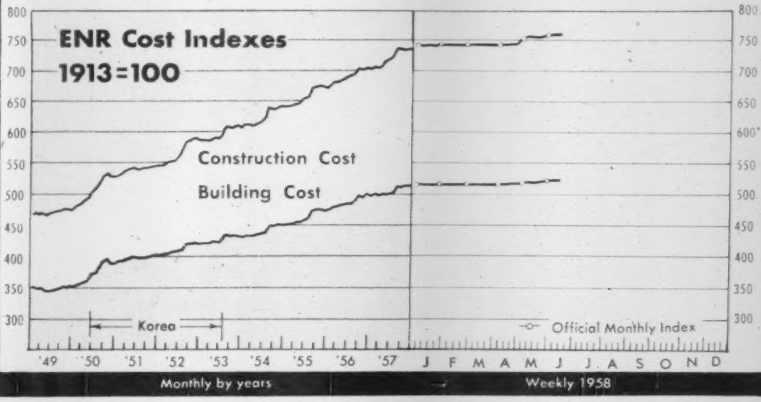
ACTIVITY THIS WEEK

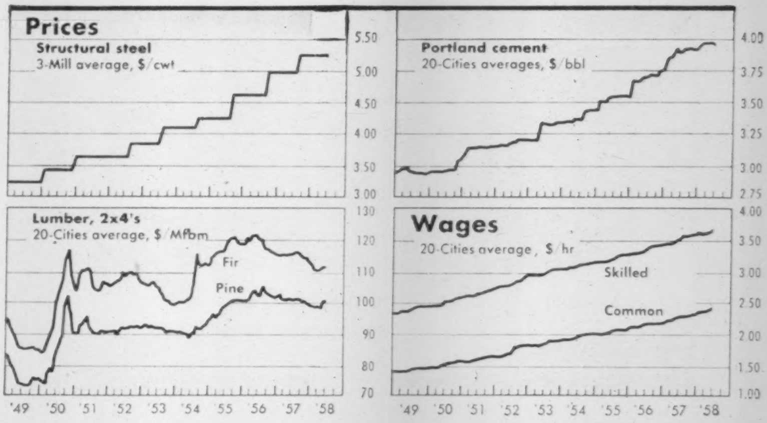


COST INDEXES AS OF NOW

ENR INDEXES (1913=100), 20-cities' average	Week of Jun. 12 1958	% Change from May 8 1958	% Change from Jun. 13 1957
Construction Cost	757.55	+0.27	+4.8
Building Cost	521.74	+0.41	+3.4

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.





AMOUNT OF CONTRACTS LET

By Ownership	This Week millions	Cum. 25 wks 1958 millions	Chge '57-'58 %
All Heavy Constr.	$429.8	$9,145.0	+0.3
Private	135.1	4,046.0	−5
Public	294.7	5,099.0	+5
State & Municipal	220.3	3,764.5	+8
Federal	74.3	1,334.5	−1
By Type of Work			
Public			
Waterworks	6.8	152.8	−20
Sewerage	29.0	293.2	+12
Bridges*	32.9	270.5	−28
Highways	83.1	1,437.1	−1
Earthwork, Waterways	15.2	557.3	−3
Buildings, Excl. Housing	54.2	1,248.3	+18
Housing	26.0	538.0	+56
Unclassified	47.5	610.3	−1
Private			
Mass Housing	79.7	1,849.1	+22
Commercial	22.0	980.2	+17
Industrial	17.9	968.7	−42
Unclassified	15.5	239.5	+3

* Includes private bridges.

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

NEW CAPITAL FOR CONSTRUCTION

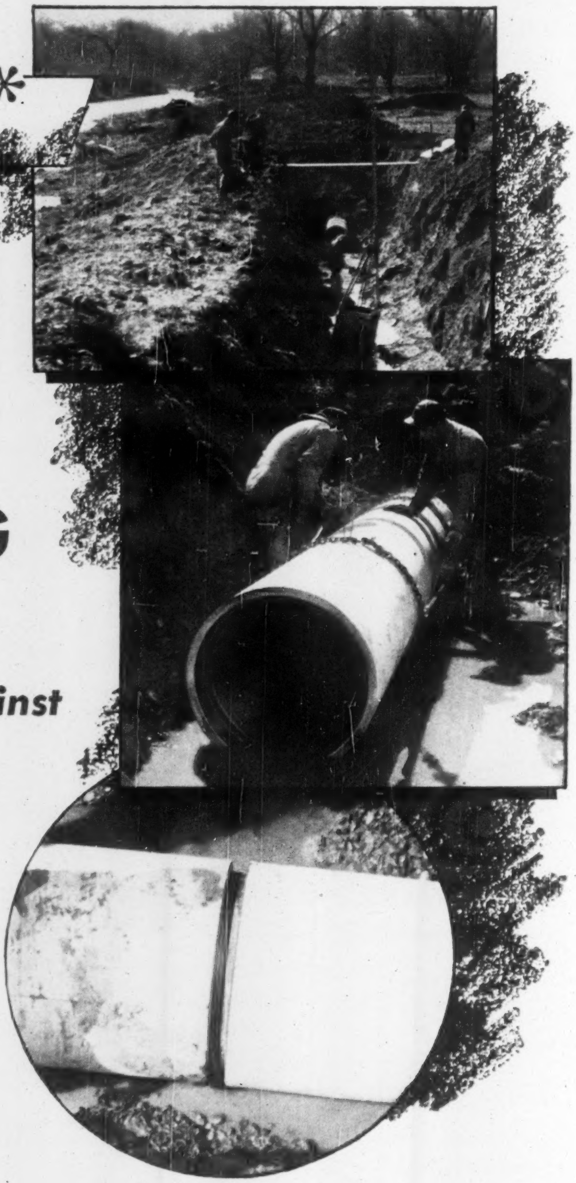
	Week of June 12 millions	Cum. 24 wks 1958 millions	Chge '57-'58 %
Corporate Securities	$104.4	$2,637.3	−10
State and Municipal:			
All Except Housing	117.0	3,456.5	+31
Housing	10.0	33.8	−19
Federal Loans	4.7	87.3	−19
Federal Aid	...	....	...
Total Nonfederal	$236.2	$6,214.9	−19
Federal Appropriations:			
Projects in U. S.	$3.5	$606.7	+2.09
Outside U. S.	...	....	...
Total New Capital	$239.7	$6,821.5	−12

ENR COST INDEXES IN 22 CITIES, 1913 = 100

City	Construction Cost June 1958	Construction Cost Percent Change from last Month	Construction Cost Percent Change from last Year	Building Cost June 1958	Building Cost Percent Change from last Month	Building Cost Percent Change from last Year
Atlanta	558	0	+6.7	461	+1.0	+4.2
Baltimore	701	+3.5	+9.0	527	+0.5	+4.7
Birmingham	593	0	+6.8	480	+0.7	+5.1
Boston	793	+0.1	+6.3	528	+0.6	+2.0
Chicago	838	+0.1	+0.9	535	+1.1	+4.7
Cincinnati	746	0	+4.6	502	0	+2.7
Cleveland	849	0	−0.8	515	0	−1.3
Dallas	553	0	+5.3	459	0	+4.6
Denver	725	0	+3.2	525	+0.2	+2.8
Detroit	852	−0.2	+3.5	545	−0.4	+1.9
Kansas City	762	0	+3.7	527	0	+4.9
Los Angeles	814	0	+11.3	514	+0.7	+3.7
Minneapolis	818	0	+4.8	548	+1.9	+3.3
New Orleans	591	+1.0	+3.4	477	+0.4	+2.1
New York	912	0	+7.1	601	+0.7	+4.0
Philadelphia	795	+2.6	+2.0	569	+1.4	+1.6
Pittsburgh	819	+1.9	+7.5	573	+0.7	+5.9
St. Louis	840	0	+6.5	558	0	+3.8
San Francisco	798	+4.7	+5.3	507	0	+4.4
Seattle	789	0	+5.4	470	−0.1	+3.2
U. S.—20 Cities' average	**757**	**+0.8**	**+5.0**	**521**	**+0.5**	**+3.4**
Montreal	603	+3.0	+2.8	449	+0.4	−0.4
Toronto	605	−0.3	−0.9	468	−0.4	−0.1

In CANTON, OHIO*

TYLOX
RUBBER PIPE JOINTS
and
REXON PIPE COATING
"team up"
to prevent leaks and guard against corrosion of new city sewers



Engineers had their eyes on future as well as present costs when they designed Canton's recent sewer expansion project. Here's how their call for TYLOX-jointed, REXON-coated concrete pipe helps assure Canton citizens of "most for the money" from their tax dollar . . .

NO JOINT LEAKS – even under tough conditions like those shown in the top photo. TYLOX prevents infiltration . . . keeps treatment plant loads at a minimum . . . eliminates root and sediment penetration.

NO ACID ATTACK – even though industrial wastes may enter the line. REXON Coating (center photo) is resistant to virtually all acids, alkalies, greases and solvents. "Teamed up" with equally durable TYLOX Joints, the resulting line is corrosion-resistant *throughout.*

FAST PIPE-LAYING – Just shove gasketed pipe home (lower photo) and the TYLOX Joint is complete. Wet trenches do not delay the work, and the *flexible* TYLOX permits immediate backfilling.

Plan now to specify TYLOX Rubber Joints and REXON Pipe Coating on your next concrete pipe job and be assured of leakproof, corrosion-resistant lines laid faster . . . Write for more details today.

* **PROJECT:**	Stark County sewer expansion project, Canton, Ohio
ENGINEER:	A. T. Holl, Stark County Sanitary Engineer
CONTRACTOR:	Shullo Construction Co., Akron, Ohio
PIPE:	Reinforced concrete, TYLOX-Jointed and REXON Coated, manufactured by United States Concrete Pipe Company, Cleveland, Ohio.

5062

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MANUFACTURING COMPANY
KENT, OHIO
427 West Grant St. ORchard 3-9555

Public Works: Congress Wants More

Where President and Congress disagree

(in millions)

Program *(spending fiscal '59)*	President Proposed *(in January)*	Congress Proposes *(this session)*
Military Construction	$2,104	$2,137
Highways (federal payments)	2,326	2,675
Airports (federal payments)	45	90
Army Civil Works	665	775
Reclamation	216	235
College & Hospital Housing (disbursements to borrowers)	222	230
Hospitals (federal payments)	112	157
Community Facilities (construction loans to localities)	24	40
Total	$5,714	$6,339

Where President and Congress Agree

(in millions)

Program *(spending fiscal '59)*	President Proposed *(in January)*	Congress Proposes *(this session)*
TVA Construction	$159	$159
Urban Renewal (federal share, site development)	60	60
Public Housing (development loans)	499	499
Sewerage (federal payments)	51	51
A-Power Construction	233	233
Total	$1,002	$1,002

The recession has pushed Congress into raising public works spending plans above those President Eisenhower proposed in January. You can get a quick idea of the changes in the chart at left.

Results already have shown up in the faster tempo of both federal and federally aided construction. A bigger effect will be felt in fiscal 1959, starting July 1. And an even greater boost will take place in fiscal 1960, when the expanded programs advance to high-gear spending for work accomplished on the construction sites.

For a number of programs, the stepped-up federal outlays anticipated in the next 12 months reveal only part of the increased spending. This is true of all programs that get federal help in the form of loans or matching grants. This includes highways, airports, local hospitals, college buildings, public housing projects, sewage treatment plants, and other community facilities.

Congress and its Democratic leaders, strongly supported by Republicans, have made a concentrated effort to prevent a construction decline that would further depress the economy.

Here is a quick rundown of some major anti-slump construction measures Congress has enacted or plans to enact before the session ends:

Military and river basin projects—these two all-federal construction activities, will get 5% to 20% more in the next 12 months than the January budget called for. The military boost comes in part from a big carryover of deferred construction.

Following the tight spending ceiling that hampered project planning until February, the armed forces have been unable to meet the contract awards and construction schedules originally established for the fiscal year ending June 30. They will carry forward several hundred million of delayed contracts for letting in fiscal '59.

Water resources projects were better able to pick up the slack when the spending clamps came off in midwinter. In fact, joint construction outlays in the current fiscal year by the Corps of Engineers and by the Reclamation Bureau will equal or slightly exceed the goals set last summer. Congress has aided the big recovery of the last four months by demanding a speed-up and voting supplemental funds where needed

As a solid base for the year starting next month, Congress is enacting everything, and more, that the Administration requested since the start of 1958.

Military construction—The Defense Department is sure of $2 billion in new authorized projects and the $1.7 billion of hard cash for those which money has not already been appropriated.

Flood control, navigation and reclamation construction are other areas where Congress is raising the Administration's ante to guarantee one of the biggest years of all time. Army Engineers are getting a record appropriation of some $770 million for civil works. Reclamation is doing almost as well with nearly $250 million definitely on the way to enactment—the largest amount for the bureau since 1950.

Water projects program is being primed for future years. Congress is voting money to start 25 to 30 new projects the Administration doesn't want and didn't ask for. These new starts will cost more than $400 million to complete.

Airport and college housing programs also will get big increases. Both actions by Congress will go against the wishes of the Administration. President Eisenhower wants federal aid for airports ended June 30, 1959. He would reduce the volume of government loans to colleges by charging a higher interest rate and limiting the type of structures to be financed.

The liberal Sparkman housing bill now on its way through Congress, however, would expand the college loan program. It authorizes $650 million additional and retains present low interest rates for financing an even broader list of structures, perhaps including academic buildings.

Airport assistance also is to be continued and expanded for four years beyond fiscal 1959 under a new Monroney bill that has the backing of Congressional leadership. The bill authorizes $512 million for airport allocations to June 30, 1963, compared with $252 million for the four-year program now coming to an end. Of the new sum, $112 million would become available immediately to speed a start on top-priority jobs among the $1 billion of planned projects reported to Congress in recent weeks by municipal and state officials.

A sizable increase for construction of local hospitals also is being pushed by committee chairmen in both houses. Congress will go along with their plans to step up appropriations for matching grants from $120 million to the authorized maximum of $210 million. Here again, the states report big backlogs of sponsors with money and plans in hand, ready to advertise for bids as soon as federal matching funds can be allocated.

Hopes Rise as Home Starts Leap

Homebuilders are more optimistic about the outlook now than they have been in two years. And May's improved housing start figures add to their cheer. The recent easing of interest rates, new availability of mortgage money and lower down payments have given a shot in the arm to the industry.

Best estimates now are that some 1.1 million new homes will be started this year—a gain of about 100,000 over 1957.

Homebuilding languished from 1955 through the first quarter of this year for a variety of reasons—the recession, high interest rates and large inventories.

But the market situation improved in April and May. Homebuilding soared. Industry officials now are confident the long drop has ended and things are looking up again.

• **Seasonal rate jumps**—Recent government statistics underline the new strength in homebuilding. Private housing starts in May were running at an annual seasonally adjusted rate of 1,010,000—higher than at any time during the first half of 1957. In April it was 950,000. In actual numbers, 105,000 housing starts were recorded in May—98,000 private and 7,000 public.

The Federal Housing Administration also reports it received 90,000 applications last month for mortgage insurance, largest one-month total in history. The GI housing program, given a new lease on life by Congress earlier this year, also is sharing in the upturn. Appraisal requests to the Veterans Administration for proposed new homes rose to 29,170 during the month, a gain of 17% over April.

• **Aiding other industries**—This increase in homebuilding already is having its side effects on other parts of the economy—especially the depressed durable goods industry. Dealers report new strength in housing has helped boost sales of refrigerators, freezers, dishwashers and kitchen ranges. Several large appliance manufacturers now are planning to increase output and employ additional help.

The figures apparently lend strength to recent housing predictions. A poll conducted by the National Association of Home Builders shows that the typical builder expects home construction to jump 10% in his area over last year.

The poll also indicated why the industry is selling more homes: The trend now is to more moderate priced homes, which will give builders a bigger market. The median price now is $14,400 compared with $15,100 a year ago. The drop results from design changes, not lower costs to builders.

However, housing economists tend to be more cautious about the outlook than the builders. Economists believe the outlook still hangs on the general economic situation and the question of consumer confidence.

• **Builders' inventories reduced**—Economists say that one reason for the sharp spring upturn may have been because homebuilders had reduced their inventories of completed dwellings by 1958. The way was cleared for them to start construction again.

But, economists admit, home starts may hit more than the 100,000 increase predicted. The surge of easy credit could return to action those builders who dropped out when the market got tough during the last two years.

Congress, meanwhile, is moving to give an added boost to the industry. The Senate Banking Committee last week approved a $2.1 billion bill to liberalize federal housing programs. The measure would provide $750 million more than the Administration had requested for urban renewal work over the next six years.

Lower Shipping Charges Postponed Until September

Hopes for lower costs on some building materials in Oregon, California and Arizona because of scheduled reduction on rail shipment charges have faded. The reduction has been suspended by the Interstate Commerce Commission and the California Public Utilities Commission so hearings can be held.

Lumber and lumber products shipped by rail between points in California or between Oregon, California and Arizona benefit from the rate reduction.

The suspension was ordered by the PUC until September 18 or further order of the commission, but the ICC did not set a deadline.

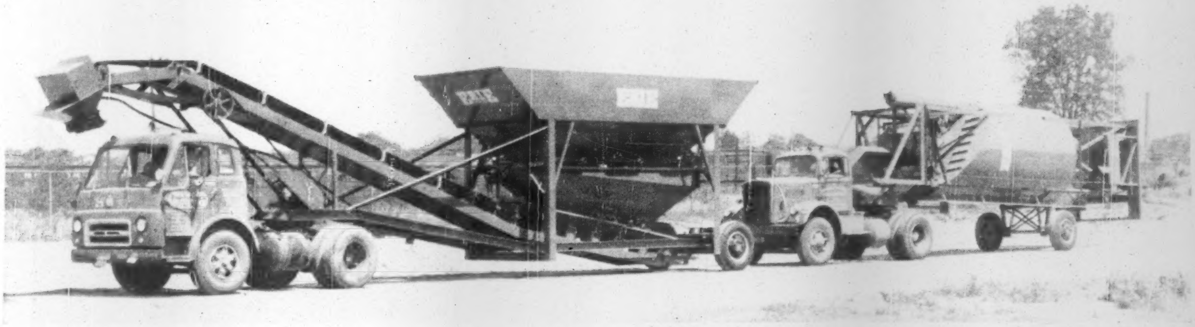
Truckers protested that the reduction, which ranges up to 30%, would bring rail rates below truck rates in some cases. Also raising a protest were northern California lumber companies who feared the rate cut would make it harder for them to compete with Oregon producers in California markets.

Lumber buyers, however, entered the dispute to argue for the rate reductions.

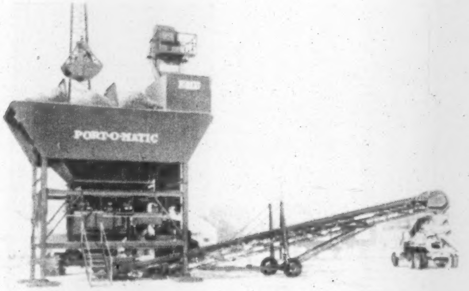
The Southern Pacific Railroad is the railroad mainly affected by the proposed change in shipping charges.

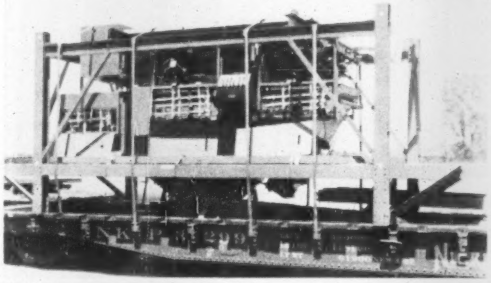
(B&F continued on page 224)

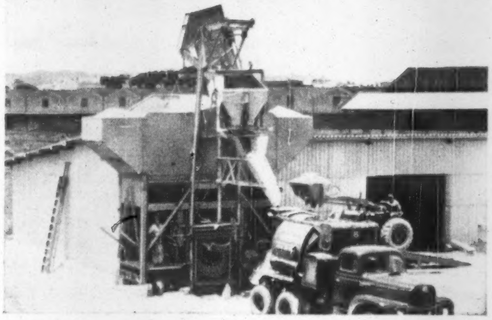
One of These 4 Erie Portables Will
HIKE PROFITS! SPEED DELIVERY!
and Cut Concrete Costs for You



The TPA-TPC can be erected and ready for operation in 3 hours. Both units are wheel-mounted and are moved with two truck tractors. All conveying and batching equipment is permanently attached. Capacity: 60 cu. yds. per hr. with 3-yd. batches. The 3-compartment bin capacity is 21 cu. yds. level. Cement silo holds 175 bbls.







No one piece of portable equipment will handle all kinds of jobs with equal efficiency. Different job applications call for different types of equipment. That's why Erie offers you a choice of models. Within the range of its capacity, each model in the Erie line is designed to deliver the most concrete for dollar invested in equipment and operating labor. We welcome the opportunity to prove these facts to you.

◀ **PORT-O-MATIC** — Designed for higher output than the TPA-TPC. Delivers 160 cu. yds. per hr. with 6-yd. batches. Set-up and take-down time 6-8 hrs. each. One piece cement elevator. Wheel-mounted conveyor. Quick disconnect plug and socket type electrical connections. No field wiring needed.

◀ **UNITIZED DECK** — packaged, high output batching system for truck mixers. Weighing batchers, scales, water meters, conduit-protected wiring and piping in one center section with hinged columns. Can be used either with Erie portable or knockdown bins. Capacity up to 200 cu. yds. per hr. with 6-yd. batches.

◀ **ERIE STRAYER PORTABLE**—small, completely portable central mix plant. Complete with gasoline or diesel power. Capacity: 40 cu. yds. mixed concrete per hour.

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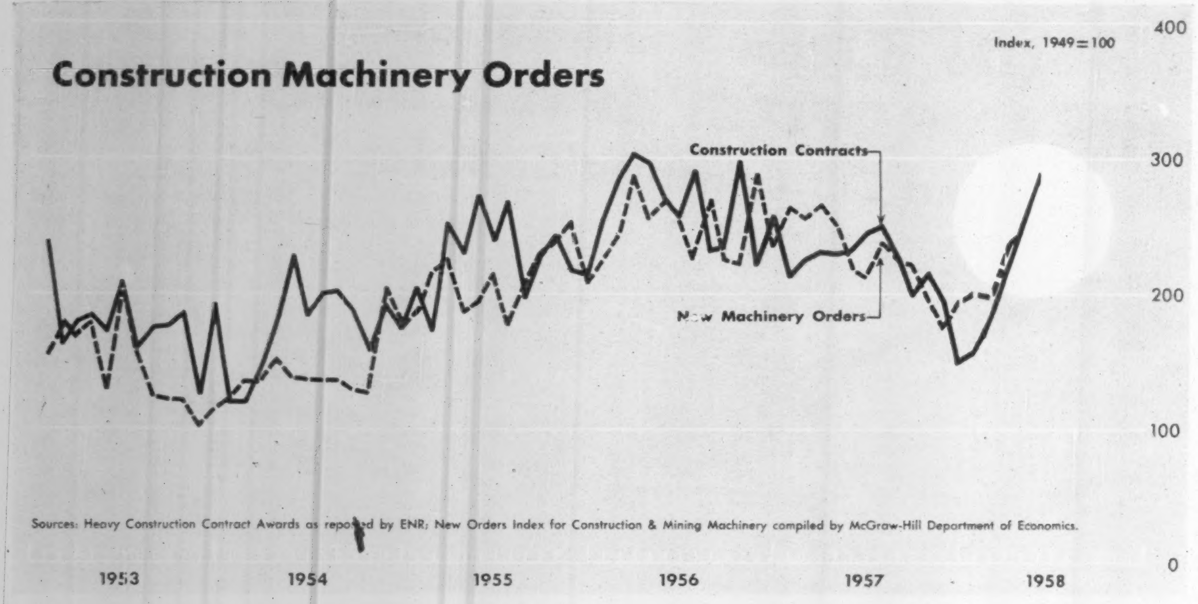


Sources: Heavy Construction Contract Awards as reported by ENR; New Orders Index for Construction & Mining Machinery compiled by McGraw-Hill Department of Economics.

April Orders Jump 4%; Volume Close to 1957

The rapid and sharp recovery of heavy construction contract awards is having its anticipated beneficial affect on the volume of new orders for construction machinery. In April, new orders rose 4% to an April index of 242 (based on 1949 = 100). It was the fifth consecutive monthly increase, as measured by the McGraw-Hill Department of Economics Index.

Order volume was the highest since April, 1957. Although contractors' buying has run consistently below year-ago volumes during the first four months of this year, the gap between this year and last is rapidly narrowing. Orders in April brought volume to within 4% of last year, whereas March volume was 13% below last year. The first two months of 1958 were 23% below 1957.

Contractors now may be investing more heavily in new rigs than at any time since early 1957, reflecting the rapid recovery in new construction business. The recovery is one of the sharpest upturns ever recorded by ENR contract awards.

The continued upturn in order volume for construction machinery apparently is being felt by some companies. At least one machinery maker, Koehring Co. Milwaukee, has recalled some of laid-off workers. Last week's announcement by the company said that a climb in orders for highway pavers and power shovels was responsible for the recall. Officials said recalls will boost employment in the structural department and machine shop by approximately 20%. Other workers may be recalled later in Koehring division's assembly departments.

Cement-Price Dip at Dealer Level Only Temporary

• Current softness in bulk cement prices at the dealer's level may not last long. A more than seasonal upturn in demand may be coming because of the sharp recovery in contract awards as reported by ENR (ENR June 5, p. 112).

• Reduced demand for cement reflects the 18 month recession in contract awards that ended in January and also severe weather conditions, that sharply reduced the rate of concrete placement schedules late last year and early this year.

As a result, prices in five of the 22 cities surveyed weekly by ENR reported drops in the price of cement during the last four weeks. The cities were Baltimore, Boston, New York, Seattle and Toronto. Only New Orleans reported a hike in the price of cement during the second quarter. Reductions were attributed to lower freight rates, but it could be that completion forced the issue.

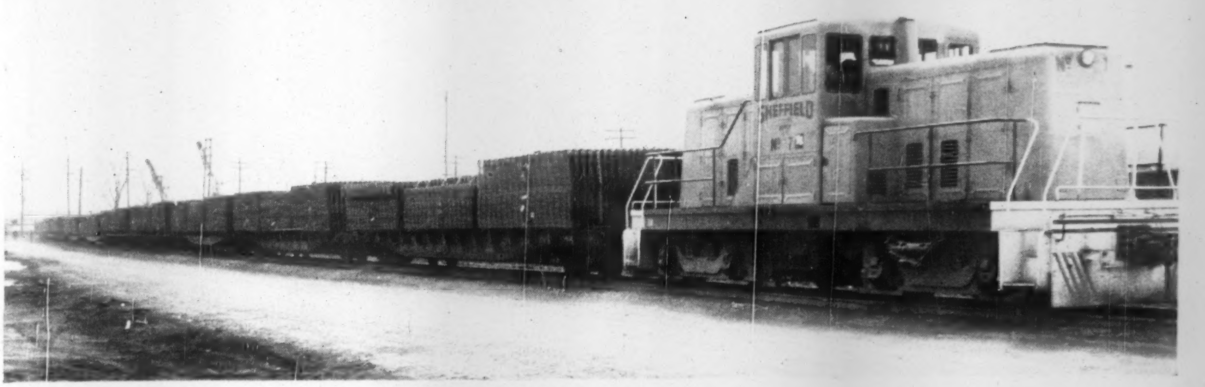
• **Shipments slump**—Portland cement production and shipment data compiled by the U. S. Bureau of Mines for the first four months of this year provide background information.

Mill shipments in April increased more than seasonally, topping April, 1957, by .9%. It also was the second month since January to rise above the year-ago figure. However, the four month total is the lowest in six years—5% under 1957's same period and 14% below 1956's January-April record.

Production spurted in April, bettering last year's April figure by a slight amount. But the four month total is off 11% from last year and 18% below the all-time high for the period set in 1956. Through April, production this year is the lowest since 1952.

• **Mill stocks trimmed**—The upturn in April shipments helped trim March's mill stocks of finished cement, but the 35.2 million bbl of cement on hand April 30 was a record for the date.

The surge in output raised the operating rate of cement mills to 79% of capacity in April. A year ago, the operating rate was 83%. However, the April figure was an improvement on the 50% to 59% rate of operations during this year's first three months.



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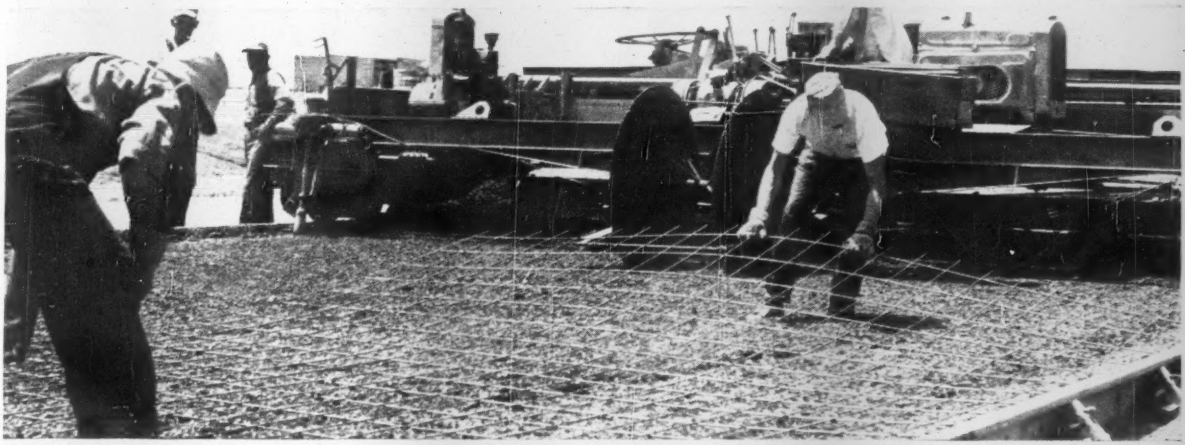

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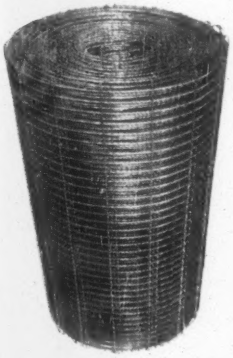

It's a clear track because Sheffield looked ahead a long time ago. We expanded and geared production to the upcoming demands of National Highway Program and other construction.

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That also goes for other Sheffield steel products for highways and all other construction. We're making prompt delivery of Sheffield Crescent Reinforcing Bars, High-Strength Bolts and Highway Fence.

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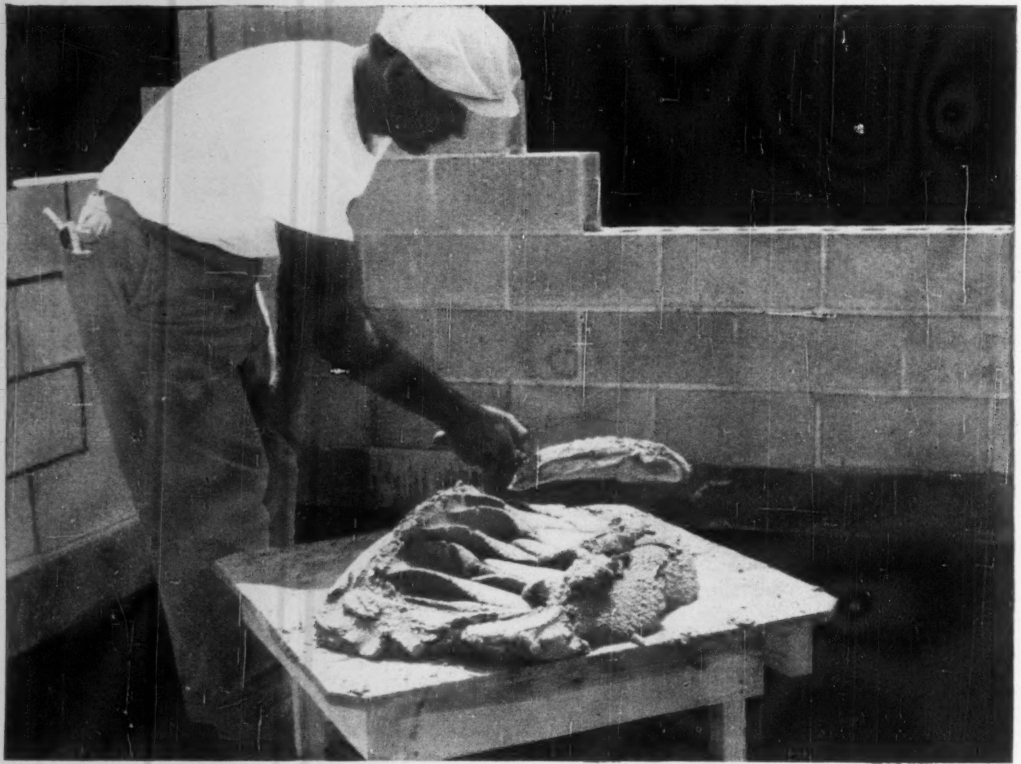
BRIXMENT

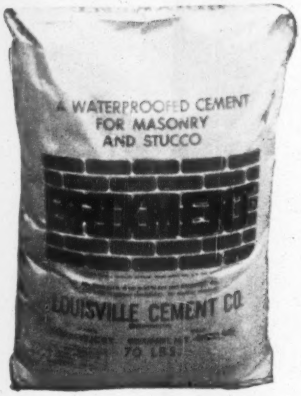
Better Mortar for Blocks



WHY IS GOOD MORTAR IMPORTANT?

Because of their size and weight, concrete blocks require mortar with "body", plasticity and water-retaining capacity. Brixment meets all these requirements. It has the *body* necessary to support the weight of the unit and hold it up to the line. It has the *plasticity* necessary to prevent the mortar from falling off the long head joint, while the block is being placed in the wall. It has high *water-retaining capacity*, which gives the bricklayer more time to shift and adjust the block to its final position before the mortar stiffens.

It is the combination of these characteristics that makes Brixment the leading masonry cement for concrete block as well as for brick.



Louisville Cement Company . . . Louisville 2, Kentucky

Labor Law Stirs Up a Storm

Whatever finally happens to antiracketeering labor legislation in Congress this year, it will become a number one campaign issue in the national elections this fall.

No matter how the legislation comes out—a new labor control bill or no bill at all—both Democrats and Republicans are making a record to take to the voters. Political machinations are behind the Senate's huffing and puffing toward a moderate law to curb union racketeering and to insure democratic practices in the trade union movement.

Both parties are determined to win the credit:

The Democrats want to put on the record a law they can claim will reform but not unreasonably restrict union behavior.

The Republicans are laying the groundwork for a platform showing they favor a somewhat tougher law, with a ready-made excuse—that it's not their fault—if a Democratic Congress fails to pass it.

This is what's behind the days of Senate debate on a bi-partisan measure written by the two most prominent members of the Senate Labor Committee—Democratic Chairman John F. Kennedy and Republican Irving Ives. It provides, essentially, for unions to make extensive financial reports to the government; for secret ballot elections and maximum terms of office for union officers; for criminal penalties where unions fail to comply.

• **Politics**—Most other Taft-Hartley issues have been whittled out of the proposed bill, except for some proposed changes sought by building trades unions on employer-payments to apprenticeship programs and pre-hire, seven-day contracts. No tightening of secondary boycotts is in the mill.

When Senators Ives and Kennedy came out with their moderate measure, they foresaw quick and easy passage, with support by non-conservatives of both parties. Then some political fireworks hit labor reform, in this order:

• Labor Secretary James P. Mitchell blasted the bill as "ineffective," raising a charge by Senator Ives that the Secretary is making a "Republican thing" out of the Ives-Kennedy measure. Mr. Mitchell and Senator Ives are both GOP liberals on the subject of labor.

• Sen. John L. McClellan, Chairman of the Senate Rackets Investigating Committee, stuck by the Ives-Kennedy measure and dropped his earlier suggestions for much tighter controls on unions. Senator McClellan took with him most conservative Southern Senators because of his committee role as investigator of union corruption and prompter of legislation to wipe it out.

• GOP conservatives, Senators Knowland of California, Goldwater of Arizona and Curtis of Nebraska threw in amendment after amendment during Senate debate on the Kennedy-Ives bill and were voted down each time. But, they can always claim that they wanted a more effective bill if there are any snags in the legislation this session.

This is also what's behind Secretary Mitchell's tactics. The Labor Secretary categorically denied political motives, but many of his complaints against the Kennedy-Ives bill are minor, and some were picked up fast by the bill's authors during Senate debate. For instance, Mr. Mitchell complained that union members would have to come to the U. S. Labor Department to see financial reports filed by their leaders—instead of being sent out to the membership.

As the debate in the Senate ran on, the Kennedy forces won all the tests. They accepted enough minor changes in the law so the Republicans can say that the bill was being strengthened, but still, the Democrats could claim they had passed the law.

Republican Labor Secretary Mitchell
He doesn't like the Kennedy-Ives bill.

Democratic Senator John F. Kennedy
Says critics are politically inspired.

Actually, in the amendment voting, it was a combination of Democrats and liberal Ives-led Republicans who sided together. They did so point-by-point as the amendments were raised and the tougher changes that had been offered by the conservatives went down the drain.

• **House action**—This emphasis on corruption alone—though union financial reports and restrictions on labor leaders' elections—opened up some chances that the House might get into labor legislation this session.

A middle-of-the-road labor bill may well be pushed hard by the Democratic leadership in Congress. If it's not interpreted as too strict by unions, the Democrats see the new legislation as a political achievement for the national elections—they have done something about labor racketeering.

However, the problem is to get by the House Labor Committee and Chairman Graham Barden of North Carolina, who resists any labor legislation and particularly the moderate variety. But, if the House leadership pushes hard enough, it could break the legislation through such a roadblock.

Then the Democrats could claim a labor law against corruption; the Republicans would answer they made it tough enough to be effective.

(Labor continued on page 228)

Engineers: 10% Are in Unions

That's what NSPE reports in a study designed to help engineers evaluate the facts in the union issue

Some 40,000 of the nation's professional engineers and scientists are union members.

The estimate was made this week by the National Society of Professional Engineers, which has consistently opposed unionization of professional engineers. It is the result of a study undertaken by the society to help engineers evaluate the facts in the controversial issue of unionism versus professionalism.

The 40,000 professional employees represented by unions, says NSPE, make up "something less than 10% of the total engineering population." Only 30,000 of the total, however, are considered by NSPE to be dues-paying union members.

The study is limited to those 28 unions in which professional or technical personnel are predominant. Excluded are unions containing "a sprinkling or small percentage of engineers or technicians."

Unions like Walter Reuther's United Auto Workers, which claims professional membership, are not included. But the list does embrace units in the American Federation of Technical Engineers and the International Union of Electrical Workers, both AFL-CIO.

NSPE's study was prompted by a lack of accurate information on the extent of union success in the professional field. The society says union membership claims are often exaggerated and technicians frequently are lumped among professionals because of a tendency to use the terms loosely.

No attempt has been made by NSPE, however, to classify professional union membership. But of particular interest to civil engineers are four unions generally believed to have a lot of civil engineers. As listed by NSPE, they are:

- Engineers and Architects Association, Civic Center Chapter. Members include 1,300 professional workers and 300 technicians employed by the Los Angeles Water and Power Co. and the City and County of Los Angeles.
- Engineers and Architects Association, Metropolitan Chapter. Members are employed by the City and County of Los Angeles; 700 are professional and 400 are nonprofessional.
- Engineers and Scientists of California, with 900 professional and 900 nonprofessional members. It bargains with the Western Association of Engineers, Architects and Surveyors, the Pacific Gas & Electric Co. and four Bay area soil and foundation engineering firms in Sacramento.
- TVA Engineers Association. Membership embraces 1,665 professional and 335 nonprofessional employees of the Tennessee Valley Authority at 17 locations.

The union tabulation was released by NSPE's Engineers-in-Industry Subcommittee at the society's annual meeting in St. Louis.

Jobless Pay: Now It's Up to the States

Amid predictions that unemployment may hover around the 5 million mark through next winter, Congress made the new extended jobless benefit law operative last week by appropriating $665 million to finance it.

New York quickly became the first state to qualify for aid under the new law.

Of the amount appropriated, $640 million is for benefit payments by states, $25 million is for state administrative expenses and $600,000 is for U. S. Labor Department administration.

States may draw against the funds to extend jobless benefit payments to claimants who have exhausted the benefits presently allowed under state law. Duration of the extension is one-half the state's payment period—which means a period of 13 weeks in those states that now make payments for 26 weeks. Federal funds used must be repaid or later recouped from a higher payroll tax on employers.

Congressional implementation of the law followed close on the heels of the latest U. S. Labor and Commerce Department report on employment. That report revealed that the number of unemployed had dropped 216,000 during the month ended May 15, making the total unemployment figure 4,904,000. Number of persons exhausting state unemployment insurance benefits, however, continued to approximate 230,000 a month.

As of May 24, the number of persons drawing unemployment compensation was reported to be 2,892,000, which is a drop of 126,600 from the week before. But during the last week in May the number of new claims for jobless benefits throughout the nation increased by 13,700.

State participation in the new federal-aid law is optional. If all states participate, an estimated 630,000 workers would be eligible immediately for extended benefits, the U. S. Labor Department's Bureau of Employment Security reports.

Cement Industry Winds Up Most of Its Labor Pacts

Labor peace in the cement industry has been virtually assured for another year. Contracts covering most union workers in the industry have been completed. General settlement pattern calls for an 8 cent basic hourly wage increase.

The United Cement, Lime and Gypsum Workers International Union had signed new labor contracts with 52 manufacturers at the end of last week, reports Toney Gallo, secretary-treasurer. Some 17,000 union members are affected.

Bulk of the industry's labor contracts expired May 1 and, except in isolated instances, union members have been working on a day-to-day basis. Last year, the industry suffered a nationwide strike.

In addition to a general pay boost of 8 cents, the new contracts grant additional increases averaging 2 cents to widen the wage differentials between various classifications of workers, improve pension benefits and call for time-and-one-fifth for Sunday work.

Building Contractors Hit Jobless Pay for Strikers

A legislative proposal calling for payment of unemployment compensation benefits to strikers was assailed by contractors this week as "unjust and dangerous."

The proposal now before the New Jersey Senate has passed the state assembly. It provides jobless benefits for strikers after being on strike for six weeks but immediate benefits if the labor dispute has resulted in a lockout by the employer.

The Building Contractors Association of New Jersey says the measure will create additional difficulties in collective bargaining in the construction industry by giving an additional instrument to labor leaders to prolong strikes. The group says the bill is the result of "radical and reckless liberalism."

The contractors' blast against the bill was issued for the association by its managing director, Paul J. Brienza.

(Labor continued on page 230)

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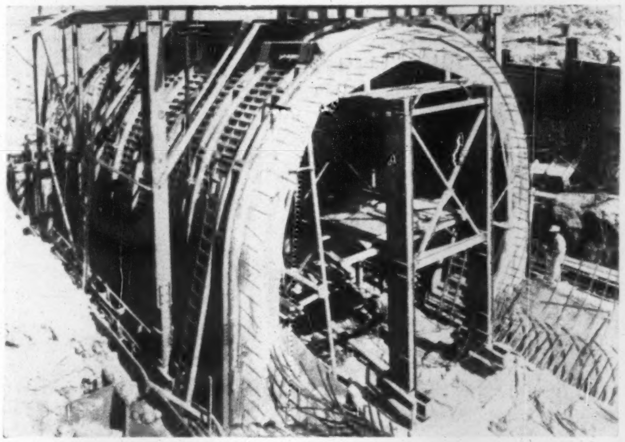

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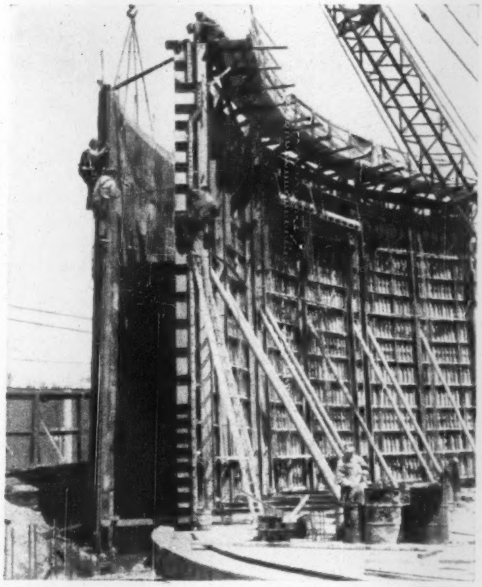

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Union Bargaining Still Strong

New contracts favor wage boosts of 15 cents or more, but some headway is made on cost-cutting codes

Construction labor costs continued their upward climb last week.

Bulk of presently effective deferred wage increases under existing long-term contracts and newly negotiated pay boosts were running 15 cents or more an hour. There was little indication that either the recession or recent wage-freeze proposals have dampened interest in long-term contracts with built-in wage boosts for the future.

On the other hand, strike-bound Cleveland contractors remained firm in their attempt to keep wage costs under control. And in St. Louis, labor and management made significant headway on a compensating factor—an agreement on work practices aimed at higher productivity and lower costs.

Other current developments in the general wage picture look like this:

- Piledrivers in 46 northern California counties and carpenters in four counties in the San Francisco area receive a 15 cent hourly wage boost this week under existing long-term contracts with the Northern and Central California Chapters of Associated General Contractors. On June 23, pipefitters covered by a state-wide contract affecting construction of California gas and oil pipelines will get an hourly wage boost of 25 cents.
- Some 30,000 construction workers in metropolitan Washington, D. C., have received deferred wage increases averaging 15 cents an hour. These stem from two- and three-year contracts that won't expire this year.
- Hourly wage increases effective this year as a result of labor contracts negotiated last week range from 12½ to 25 cents. More than half the pay boosts are for 15 cents or more.

• New Jersey—One of the largest of last week's settlements was with Passaic, N. J., carpenters, who won a 53 cent wage package in a three-year contract. Unionists will receive a 15 cent pay hike each year, plus 5 cents more for health and welfare now and an additional 3 cents next May 1, either for health and welfare or for wages.

At the same time, bricklayers in Morristown settled for 45 cents over three years, payable in six installments. Showup time is eliminated by the contract and at the end of the second year a seven-hour day becomes effective.

Both settlements are something of a setback for the Building Contractors Association of New Jersey, which has tried to keep wage increases to a minimum. The association has been making "excellent headway," says Managing Director Paul Brienza. He indicates these two settlements are not as bad as they look because both unions had wage scales 38 to 48 cents lower than their neighboring sister locals.

This week, the building contractors meet with the ironworkers, who are asking for a 54 cent increase in a three-year contract—the amount granted by rigging contractors who employ only 6% of the ironworkers in northern New Jersey.

• Detroit—Meanwhile, the first major settlement was reached with Detroit's building trades unions, now in their second month without contracts.

Painters settled for an increase of 20 cents—12½ cents for wages and 7½ cents for vacations. The union gave up its demand for travel time pay and for premium pay when rollers are used.

Later in the week, settlement on a two-year contract ended a five-week strike by 6,000 carpenters against the Builders Association of Metropolitan Detroit. Pact calls for an immediate pay boost of 15 cents and a similar increase next year.

Although the strike was limited to BAMD, the settlement covers the balance of the District Council's 18,000 members employed by the Associated General Contractors and the Carpenters Contractors Association. Both participated in the bargaining.

• Ohio—In Cleveland, building trades' peace talks collapsed again last week and a city hall mediation session was recessed until this week.

More than $350 million worth of homebuilding, industrial and commercial construction projects have been shut down since the dispute began May 1. The Building Trades Employers' Association, which has been plugging for adoption of a cost-cutting code with only a modest wage increase, has vigorously resisted union demands for an 18½ cent hourly wage boost.

Elsewhere in Ohio, cement finishers employed on Ohio road projects won 12½ cents an hour from the Ohio Contractors Association and painters in Columbus settled for 20 cents spread over three installments this year. Carpenters in southwestern Ohio and northern Kentucky agreed to a 12½ cent wage boost in a one-year pact.

• Chicago—Meanwhile, structural ironworkers in the Chicago area have reached the $4.00 an hour mark in wages. After two days of "unauthorized walkouts" they settled for 35 cents in a two-year contract—20 cents now, 15 cents next year and 1 cent for apprenticeship training.

The ironworkers receive the highest wage ever achieved by a building trades union in Chicago, under the contract, signed by Local 1 which represents 2,800 workers.

• New York—In Buffalo, laborers ended a week-long strike with a two-year contract that grants a 25 cent wage boost in four installments—15 and 5 cents this year and 10 and 5 cents next year.

In Binghamton, four trades have settled with the Associated Building Contractors for raises ranging from 13 to 19½ cents. Carpenters will get 19½ cents, bricklayers 13 cents and laborers and operating engineers each 13½ cents.

• Productivity—Amid this upward trend in labor costs, construction labor and management and industrial representatives in St. Louis have been working quietly toward lower costs through improved work practices.

After nearly a year of cooperative effort, nine of the building trades unions on the East Side of St. Louis and the Southern Illinois Builders Association signed an agreement embodying the "Ten Commandments"—a work practice code originally adopted by the AFL-CIO Building and Construction Trades Department. The code seeks to eliminate featherbedding and other wasteful work practices.

The agreement runs until January 1, 1961, and contains an automatic renewal clause subject to notice of termination or modification by either party.

At the same time, all unions in the St. Louis Building and Construction Trades Council have endorsed the third of the "Ten Commandments." That section requires strict adherence to starting and quitting times. The endorsement was achieved by a joint committee of the council and Associated General Contractors.

No-Man's Land a Knotty Problem

Can Congress find a practical way to bridge the no-man's land that exists between state and federal jurisdiction over labor matters?

In testimony before the Senate labor subcommittee last week, National Labor Relations Board Chairman Boyd Leedom indicated that any attempt to solve the problem by increasing the work load of the NLRB will be a costly one for taxpayers.

Even a 20% increase in the board's work, he said, would require an additional appropriation of $1.5 million to enable the board to handle it.

At the present time, small employers—many of them in the construction industry—have no place to turn for relief in labor disputes.

Two things account for this. The courts have ruled that Congress, by legislating on labor matters in interstate commerce, has pre-empted the labor field from state regulation—including the right of state courts to act—except in limited areas. And since 1950, the NLRB has, as a matter of expediency, applied its own jurisdictional standards under which it refuses to hear cases that do not involve much interstate commerce. Together, these produce a no-man's land in which the states are powerless to act and in which the NLRB can but refuse to act.

The Associated General Contractors of America and the National Association of Home Builders have asked Congress to put an end to the dilemma.

Proposals endorsed by the AGC include an authorization to the states to act where the NLRB refuses to. NAHB suggests that the extent of federal pre-exemption and the right of the NLRB to juggle its jurisdiction be clarified by law and that a certain amount of concurrent jurisdiction between state and federal governments be allowed where state law is consistent with federal law.

This split in approach is about the same as the one produced by the states' rights issue in the current Congressional debate on labor law (see page 227).

In the Kennedy-Ives labor bill now before Congress, the Senate Labor Committee proposed to deny the NLRB the right to exclude entire classes of cases from its jurisdiction. (Present exclusions are based on dollar volume of interstate commerce performed by those seeking NLRB relief.) This would amount to a mandate to the board to exercise its full jurisdiction—which would mean a substantially heavier workload and no enlargement of state power.

The proposal was later amended to allow the NLRB to cede its unused jurisdiction in certain cases to the states. But the doctrine of federal supremacy is otherwise unimpaired.

"I think any way you look into this thing," said Mr. Leedom, "you have problems."

The AFL-CIO has told Congress there is "no concensus as to what form" the cure should take and that "the complexity of the subject" is a barrier to action at this time. It accordingly suggested that legislation be delayed until "a more intensive examination" has been made.

Union Organizing Methods Are Under Attack

Union efforts to improve and stabilize labor relations and to strengthen union membership in a mixed union and nonunion area through use of a standard agreement with union contractors may be influenced by a forthcoming decision from the Federal Court of Appeals for the Fourth Circuit.

The court has before it a National Labor Relations Board decision that exonerated the Baltimore Building and Construction Trades Council (AFL-CIO) from a secondary boycott charge stemming from a 1955 strike against a Baltimore tile contractor who refused to sign a standard agreement. One effect of the agreement was to commit contractors who signed the agreement to using union subs or working for union general contractors only (ENR Feb. 6, p. 106).

Appeal, filed by Associated Builders and Contractors of Maryland and Selby-Battersby and Co., was argued in Ashville, N. C., June 3. Opposing the appeal was the NLRB and the Building Trades Council.

Case climaxes several years of labor strife over open shop operations in Baltimore (ENR Nov. 10, 1955, p. 82). Original defendants included five striking unions that settled with the NLRB before the board proceedings terminated.

Open shop interests claim the strikes were an attempt to enforce the standard agreement, violated the self-organization rights of workers and added up to an unlawful secondary boycott against nonunion contractors. They now contend the NLRB erred in not holding the council responsible for the strikes.

OFFICIAL PROPOSALS

RATE: $2.40 per line (or fraction) per insertion.

CLOSING DATE: 10:30 a.m. Friday for issue out following Thursday.

SEND COPY: Official Proposal Division, Engineering News-Record, P. O. Box 12, New York 36, N. Y.

Bids: July 1st, 1958

Contract BP-130.002

ADVERTISEMENT
THE PORT OF NEW YORK AUTHORITY
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NEW PIERS 2 & 3
DEMOLITION OF BUILDINGS
46 THROUGH 53

Sealed proposals for the demolition of Buildings Numbers 46 through 53 at the Brooklyn-Port Authority Piers will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, July 1, 1958, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will reecive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman
New York, June 19, 1958

U. S. Government

Bids: Sept. 15, 1958.

Rayon Project Government of Iraq

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The Development Board and Ministry of Development of the Government of Iraq invite tenders from qualified firms for the supply, delivery and erection of a complete plant to produce Viscose Rayon and Staple Fibre.

Tenders for the following parts of the complete plant can also be submitted:

Viscose preparatory equipment
Rayon spinning machines
Twisting machines
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Refrigerating compressor, air cooling, air conditioning and ventilation
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Full information regarding this tender can be obtained on and after June 10, 1958, from Embassy of Iraq, Washington, and from the Office of the Consulting Engineers, Messrs. ING. A. MAURER, S.A., No. 3, Dammweg, Berne, Switzerland.

All tender documents are to be submitted in English to the Ministry of Development, D. G. Legal Affairs and Contracts on or before 12 noon, local time, on Sept. 15, 1958.

Minister of Development

OFFICIAL PROPOSALS

Bids: June 26, 1958.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, Canal Law and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 26th day of June 1958, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following Projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 2, LACY KETCHUM, District Engineer, 109 No. Genesee Street, Utica 1, New York						
Oneida (Rte. 46 & 49)	FARC 58-70	Durhamville-Rome, SH 1157 Vienna-New London, SH 1159 Proj. DU-526(2), DS-458(2)	1.29	Asphalt Concrete 390′ Welded Plate Girder Br.	$33,000 Plans $2	$607,000
Oneida (Rte. 412)	FARC 58-65	Hamilton College-Clinton SH 1610 Proj. DS-473(1)	0.17	9″ Cem. Conc. Pavt. 32′ Var. Wide = 0.14 Mile Asph. Conc. = 0.02 Mile Misc. Work = 0.01 Mile Prestressed Conc. Beam Br. 103′	$13,000 Plans $2	252,000
DISTRICT No. 3, EARLE E. TOWLSON, Acting District Engineer, 333 E. Washington St., Syracuse, N. Y.						
Cort., Onon., Osw. & Wayne (Rtes. 31, 48, 221; 11, 3 & 29)	RC 58-51	Br. No. 1, SH 9239; Br. No. 2, SH 8259; Br. No. 1; SH 378; Br. No. 2, SH 8420 & Br. E-116, SH 1714	....	Cleaning & Painting 5 Bridges	$1,300 Plans $2	24,000
Cort. (Rte. 26)	FASSH 58-8	Upper Lisle-Willet, Pt. 2 Proj. S-513(1)	4.53	Asphalt Concrete	$35,000 Plans $2	636,000
Onon. (Rte. 20N)	FARC 58-53 RC 58-54	Cazenova-Manlius, Pt. 3, SH 9025 Proj. DS-769(3)	4.39	Asphalt Concrete	$27,000 Plans $2	460,000
Oswego	US 97	Lock O-2, Oswego Canal at Fulton New York	....	New Gates & Lowering Sills	5% of Bid Plans $10	
Tomp. (Rte 13)	FARC 58-62	Cayuta-Newfield, SH 5474 Ithaca-Newfield, SH 5214 Proj. F-560(6)	9.70	9″ Cem conc. Pavt. 24′-36′ Wide 5 Prestressed Conc. Brs. 60.1′, 38.9′, 38.5′, 46′ and 47′	$175,000 Plans $10	3,159,000
DISTRICT No. 4, B. F. PERRY, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Liv. & Ont. (Rtes. 5 & 20)	FARC 58-29	Lima-East Bloomfield Pt. 1 and Pt. 2, SH 5142-5041 Proj. DF-343(14)	0.47	Asph. Conc. = 0.45 Mile Misc. Work = 0.02 Mile Prestressed Conc. Bridge 140.4′	$30,000 Plans $2	541,000
Mon.	LOSPRC 58-1	Lake Ontario State Parkway Sect. A, Br. No. 2	....	Repairing, Cleaning and Painting 3 Span Composite Beam Bridge	$1,600 Plans $2	29,000
Wyom. (Rte. 20A)	FARC 58-66	Varysburg-Warsaw Pt. 2, SH 1349-A Proj. DF-767(3)	0.42	Asph. Concrete 26.5′ Span R.C. Box Br.	$6,000 Plans $2	112,000
DISTRICT No. 5, E. G. H. YOUNGMANN, District Engineer, State Bldg., 65 Court Street, Buffalo 2, New York						
Erie (Rte. 16)	FARC 58-63	Center Street, SH 9218 Proj. DF-573(4)	3.46	Asphalt Concrete	$30,000 Plans $2	518,000
Erie & Niag. (Rte. 93)	FARC 58-68	Akron-Tonawanda Creek, SH 947 Griswald Street-Bratts Bridge, SH 660 Lockport-Tonawanda Creek, SH 749 Proj. S-685(2)	3.31	Asph. Conc. = 3.19 Mile Misc. Work = 0.12 Mile 2 Prestressed Conc. Brs. 64′ and 146′ 1 Comp. WF Beam and Girder Br. 162.5′	$70,000 Plans $5	1,272,000
DISTRICT No. 7, R. W. SWEET, District Engineer, 444 Van Duzee Street, Watertown, New York						
Clint.	FISH 58-23 FIC 58-1 FARC 58-5	Int. Rte. 502, Sect. 7B-2 (Rugar St. To Cumberland Head Rd.) Plattsburg-Mooers Pt. 2, SH 259 Proj. I-IG-1119(10), F-576(4)	4.70 (9.69 Acc.)	Asph. Conc. = 14.35 Mile Misc. Work = 0.04 Mile 5 Hy. Seps. Prestressed Conc. Beams 148.4′, 284.8′, 249.2′, 232.8′ & 246.5′ 1 Twin R.C. Box Bridge 36′	$440,000 Plans $20	8,009,000
Jeff. (Rtes. 11 & 37)	FARC 58-46	Watertown-Philadelphia Pt. 1, SH 5651 Watertown-Theresa Pt. 1, SH 565 Proj. DU-DF-572(5)	1.07	Asphalt Concrete	$16,000 Plans $3	289,000
DISTRICT No. 8, K. G. RAUER, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Dutch. (Rte. 9)	FARC 58-61	Poughkeepsie-Hyde Park, SH 453, Vanderbilt SH 9004; Hyde Park-Staatsburg SH 5135 Proj. DF-322(6)	2.75	Asphalt Concrete	$15,000 Plans $2	268,000
Orange (Rte 9W)	RC 58-60	West Point Military Reservation-Cornwall Pt. 1, SH 8500	0.18	9″ Cem. Conc. Pavt. 24′ Var. Wide (Access Drive)	$3,000 Plans $2	53,000
Orange (Rte. 9W)	RC 58-3	West Point Military Reservation-Cornwall Pt. 1, SH 8500; Cornwall-West Point Pt. 3, SH 5573; West Point-Central Valley SH 5328-5328A; Crystal Lake-State Hy. 8078, SH 9328 and Ft. Montgomery-West Point Jct., SH 8526	9.16	Beam Type Guide Railing	$4,000 Plans $2	80,000
Orange (Rte 32)	FARC 58-55	Vails Gate-Newburgh City Line, SH 9033 Proj. DF-532(12)	2.99	9″ Cem. Conc. Pavt. 24′ Wide	$45,000 Plans $3	830,000
Ulster (Rte. 209)	FARC 58-47	Kingston-Ellenville, Pt. 2, SH 305 Kingston-Ellenville, Pt. 1, SH 230 Proj. DF-395(4)	7.33	Asphalt Concrete	$40,000 Plans $2	710,000
West. (Rte. 9)	FARC 58-58	Broadway-Hastings-Dobbs Ferry-Mt. Pleasant-Tarrytown-North Tarrytown, SH 9206 Proj. DF-682(8)	2.25	Asphalt Concrete	$7,000 Plans 92	133,000
West.	FICWE 58-1 FIHT 58-2 FARC 58-67	Int. Rte. Conn. 520 Cross West, Exp'y. (Elmsford Sect.): N.Y. State Thruway, Hudson Sect., Sub. 10 (Elmsford Interchange): Tarrytown-White Plains Pt. 1 SH 503 and Access Ramps, Cross Sts., SH 9246 and SH 5571 Proj. I-1101(6); U-358(9)	3.73 (5.68 Acc.)	9″ Cem. Conc. Pavt. 2 @ 36′ Var Wid = 3.73 Mi. 9″ Cem. Conc. Pavt. Var. Wide (Acc. etc.) = 4.24 Mi. Asph. Conc. (Acc. etc.) = 1.44 Mi. 11 Comp. WF Beam Brs. 233.1′, 289.7′, 1,076.2′, 157′; 253.1′, 171.4′, 204.8′, 132.8′, 286.8′, 283.1′, and 222′ 2 Closed R.C. Box Brs. 23.6′ and 33.7′	$750,000 Plans $20	13,647,000
DISTRICT No. 9, J. C. FEDERICK, District Engineer, 71 Frederick Street, Binghamton, New York						
Broome (Rte. 17 & 11)	FARCC 58-59	Binghamton City: Court Street, FAC 48-7 Proj. DF-344(23)	0.86	Asphalt Concrete Ty. 2A	$6,000 Plans $2	109,000
Del. (Rte. 8)	FARC 58-40	Deposit-Masonville, SH 1888 Proj. DS-514(1)	7.81	Asphalt Concrete	$39,000 Plans $2	705,000
Otsego & Schoh. (Rte. 165)	FARC 58-64	Roseboom-Janesville Pt. 2, SH 9234 Roseboom-Hanesville Pt. 1, FASSH 54-4 Proj. DS-412(2)	4.15	Asphalt Concrete	$50,000 Plans $3	899,000
DISTRICT No. 10, M. E. GOLL, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Bronx	FICBE 58-3 FITNE 58-1	Int. Rte. Conn. FAI 513 (Cont. No. 1) Cross Bronx Expressway and Throgs Neck Expressway Proj. I-1112(5)	2.53	Demolition of Buildings	$10,000 Plans $3	192,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON

SUPT. OF PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: June 26, 1958.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 26th day of June 1958, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following Projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 3, E. E. Towlson, Acting District Engineer, 333 E. Washington Street, Syracuse, New York						
Cortland (Rte. 41)	FARC 58–19	McGrawville, S.H. 378 McGrawville-Solon, S.H. 5438 Project DF-525(3)	2.07	Asphalt Concrete Ty. 1A	$27,000 Plans $2	$504,000
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Monroe	FAC 58–6	Rochester City: Inner Loop (Front St. to North St.) Project DU-1089(8)	0.63	Demolition	$12,000 Plans $2	206,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

Bids: July 8, 1958.

ADVERTISEMENT FOR BIDS
FOR
WATER SOFTENING PLANT ADDITION
DES MOINES WATER WORKS
DES MOINES, IOWA

Sealed bids will be received by the Board of Water Works Trustees, Des Moines Water Works, at their office, 1003 Locust St., Des Moines, Iowa up to 10 o'clock A.M., Central Standard Time, July 22, 1958, on the following contracts:

Contract A—Structures and Outside Piping
Contract B—Filter Equipment
Contract C—Mixing and Settling Basin Equipment
Contract D—Pumping Equipment

The plans and specifications are on file and may be examined at the office of the Des Moines Water Works, 1003 Locust St., Des Moines 7, Iowa, and at the office of Alvord, Burdick & Howson, Engineers, at 20 North Wacker Drive, Chicago 6, Illinois.

Plans and specifications may be obtained by depositing $25.00 for Contract A, and $15.00 for Contracts B, C and D, with the Board of Water Works Trustees or Alvord, Burdick & Howson for each set so obtained. The amount of the deposit for one set will be refunded to each actual bidder who returns the plans and specifications in good condition within 10 days after the opening of bids. Additional copies of the plans and specifications may be bought for the same price, with no refund.

Each bidder shall deposit with his proposal a certified check or bid bond in favor of the Board of Water Works Trustees, in the amount of five per cent (5%) of his bid, which shall be forfeited in case the contractor fails to enter into contract with good and sufficient bond within 10 days after the contract has been awarded to him.

No bid may be withdrawn, after the time for opening bids is past.

The right is reserved to reject any or all bids or waive any informality in any bid, and to accept any considered advantage to the Board.

BOARD OF WATER WORKS TRUSTEES
DES MOINES WATER WORKS
By M. K. TENNY, GENERAL MANAGER

U. S. Government

Bids: July 17, 1958

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5064) will be received at Camp White, Oregon until 10 a.m., Pacific Standard Time, July 17, 1958, for furnishing labor and materials for earthwork and structures for South Fork Collection Canal, Station 291/10.3 to Station 450/28.1, and Deadwood Creek Siphon for Daley Creek Collection Canal, Talent Division, Oregon, Rogue River Basin Project. Location east of Medford, Oregon. Principal items are 68,000 cu. yds. excavation; 300 cu. yds. concrete in structures; 2,500 lin. ft. concrete pipe, 36- to 48-inch; and other work. Completion time 470 days. For particulars, address Bureau of Reclamation, P. O. Box 386, Camp White, Oregon; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

Bids: June 30, 1958.

Central Electrica De Furnas S. A.
Notice to
Hydraulic Turbine Manufacturers

Applications for pre-qualification of bidders for the manufacture and delivery of hydraulic turbines will be received at the main office of Central Electrica de Furnas S.A. (FURNAS) in Rio de Janeiro, Brazil, Rua Sao Jose 90—3° andar, not later than 12:00 AM of June 30, 1958.

Tenders will cover the first stage (3 to 5 units totalling 600,000 HP) of the Furnas hydro-electric development on the Grande River, near the town of Passos, State of Minas Gerais, Brazil.

Initial installation shall provide for operation of the first unit early in 1962 and of subsequent units at about 3 months' intervals.

The Furnas development will have an ultimate installed capacity of 1,500,000 HP, with 8 to 12 units rated as above.

Applicants for pre-qualification must submit adequate information on the following items:

1. Manufacturing experience on large turbines.
2. Orders in hand and scheduled deliveries up to 1962.
3. Research, design and testing facilities.
4. Available shop space and facilities, including size limitations of main machine tools.

FURNAS will only consider tenders submitted by the manufacturers selected among applicants at its sole discretion and judgement. Negotiations with FURNAS shall be held directly by the manufacturers' head office or through branch offices or subsidiaries in Brazil. FURNAS will not deal with intermediaries or agents.

Invitations for tender shall be issued in July/August, 1958 for submittal of same by November 1958. Placing of order with the successful bidder is scheduled for about January 1959.

Bids: July 10th, 1958

Administration Building Area
Poughkeepsie, N. Y.

NOTICE TO BIDDERS

Poughkeepsie, New York

Sealed proposals will be received by the New York State Bridge Authority at its office at Mid-Hudson Bridge Plaza, Poughkeepsie, until 2:00 P.M. Eastern Daylight Saving Time on the 10th day of July 1958, at which time and place they will be publicly opened and read, for the furnishing of the labor and material necessary for the developing of the Administration Building Area at the easterly approach to the Mid-Hudson Bridge at Poughkeepsie, New York.

Plans, specifications, proposal blanks, form of contract, bond and information for bidders may be seen at the office of the New York State Bridge Authority, Mid-Hudson Bridge Plaza, Poughkeepsie, New York, and copies of the same may be obtained therefrom upon a deposit of Fifteen Dollars ($15.00), which sum will be refunded if the plans and specifications are returned by bidders in good condition within twenty (20) days of bids having been received and acted upon by the New York State Bridge Authority, and Ten Dollars ($10.00) will be so returned to non-bidders.

A certified check on a National Bank, State Bank or Trust Company in the sum of ten per cent (10%) of the amount of the bid, made payable to the New York State Bridge Authority must accompany the bid, as a guarantee that the contract will be entered into, if awarded.

A faithful performance bond in the sum of one hundred per cent (100%) of the contract price will be required.

A Labor and material bond will also be required.

The New York State Bridge Authority reserves the right to reject any or all bids.

JOHN S. STILLMAN
Chairman

READ THE OFFICIAL
PROPOSAL COLUMN OF
ENGINEERING NEWS-RECORD
THIS WEEK AND EVERY WEEK

Bids: July 8, 1958

CONTRACT PN-530.002

ADVERTISEMENT
THE PORT OF NEW YORK AUTHORITY
PORT NEWARK
PAVING AND UTILITIES
NORTH OF BUILDINGS 291 & 292

Sealed proposals for the construction of pavement and utilities North of Buildings 291 and 292 at Port Newark will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, July 8, 1958, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman
New York, June 19, 1958

EMPLOYMENT OPPORTUNITIES

NATIONAL COVERAGE

Send NEW Ads and Inquiries to Classified Advertising Division
of ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36.
July 3rd issue closes June 20th

DISPLAYED RATE:

The advertising rate is $39.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.
An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.
Subject to Agency Commission.

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Box Numbers—count as 1 line.
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The Commonwealth of Pennsylvania Seeks

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Expanding operations offer opportunities to

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Salaries from $5500 to $8200 per year.

Send Complete resume to

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Experienced in the design or detailing of Erection Methods for Bridges and Structures. Write stating age, education and exper. Engineering office located New York City. Reply:

P-7501, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

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Send to office nearest you.
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• POSITIONS VACANT

Highway Engineers—Highway Engineers with a minimum of 3 years experience. Excellent opportunity with established consulting engineering firm in Middle West. P-7909. Engineering News-Record.

Have opening for several recent Civil Engineer Graduates with military obligations completed who desire to learn the construction business. Must be ambitious, aggressive, use no intoxicants, preferably single, willing to start in the field on industrial buildings and heavy construction, and willing to move. We operate throughout Kansas and adjacent states. Our organization offers excellent opportunity for advancement. We pay top wages. Martin K. Eby Constr. Co., Inc., P. O. Box 1679, Wichita, Kansas.

Concrete Engineer for mix design. Capable of supervising Material Testing Laboratory for work in southern Idaho. Ample relocation allowances. Send resume to F. C. Torkelson Company, Box 185, Idaho Falls, Idaho.

Estimators—Engineers: Experienced in buildings and general contracting. Permanent positions with General Contractor operating nationwide doing sizable jobs. Salary commensurate with experience and ability. Location—Texas. Give full details covering education, experience, references, salary and personal data. P-8091, Engineering News-Record.

Field engineering for mosquito abatement district. Experience in dragline and dozer work, eligible for Illinois registration. Liberal vacation and other benefits—salary dependent on qualifications and experience. Apply P.O. Box 30, Harvey, Illinois.

Technical Service Engineer. Civil Engineer for technical field work with customers of major cement producer. Age 24-30. Salary open, expenses, company car. Forward resume. P-8112, Engineering News-Record.

Sales Engineer with theoretical and practical knowledge of concrete construction—Billner Vacuum Concrete, S.A., 1010 Girard Trust Bldg., Philadelphia 2, Pennsylvania.

WANTED

DESIGN ENGINEERS

Expressways, Modern Highways. Min. 5 years experience. Permanent, hosp., vacation, bonus, etc.

MACCABEE, CAMBPELL & ASSOCS.
173 W. Madison St. Chicago 2, Ill.

• POSITIONS VACANT

Four Draftsmen, Civil Water and Sewerage, Layout Experience. Also one Chief of Party, Land Surveying, Municipal and Subdivision Experience, New Jersey Shore Area. P-7961, Engineering News-Record.

Responsible operator builder with many years of field construction experience desires to meet a man experienced in estimating and procurement with some contacts. Salary and participation: Must be able to prove ability. State age, formal education, kind of construction work familiar with, salary expected, percentage of participation desired, and telephone number. Information will be held in strict confidence. P-8190, Engineering News-Record.

Wanted—Assistant City Engineer—Eligible for future registration in Texas. Municipal experience desirable. Good working and living conditions. Growing city of 40,000. Permanent job with good future. Contact K. R. Caldwell, City Engineer, Harlingen, Texas.

Engineer. Petroleum background. Must know construction, piping & full operation of bulk terminal. Act as resident engineer metropolitan area. Good opportunity. Submit detailed resume in confidence with salary requirements. P-8231, Engineering News-Record.

Established building construction firm, home office in Metropolitan Boston, operating throughout New England, desires an experienced general manager to serve as administrative assistant to operating head of firm. Reply P-8232 Engineering News-Record.

Bridge Superintendent, experienced in building highway and railroad bridges. Location, Midwest. Salary open as to qualifications. Give full details covering experience, references and personal data. P-8241, Engineering News-Record.

Associate Professor, Assistant Professor, or Instructor to teach Highways, Highway Materials, and other Civil Engineering subjects. MS or PhD preferred, but BS degree considered. Rank and salary dependent upon qualifications. Appointment available immediately or September or January. Write to: Head, Civil Engr. Dept., University of Akron, Akron 4, Ohio.

Concrete Superintendent, sober, capable of building highway and railroad culverts, spillways, small dam structures. Location, Midwest, with established contractor. Please furnish complete qualification resume. P-8240, Engineering News-Record.

CIVIL ENGINEERS

Vacancy due to a promotion in Madison, Wis. Graduate engineer with some experience to begin in Engineering Dept. at about $455 a month, **unless** special arrangements can be made for a higher entrance salary due to qualifications. Annual and longevity increases to $572. Office and field work in design and construction of sewer, water, street, sidewalk and curbs. Possession of Engineer-in-Training Certificate required. No residence restrictions for U. S. citizen to begin work. Wisconsin Retirement Fund and Social Security benefits. Personnel Dept., 404 City-County Bldg., Madison 9, Wis.

OVERSEAS

An exclusive association for foreign construction workers. Learn the advantages of membership. Write for free descriptive details. Overseas Americans, Inc., 7 West 44 St., New York 36, N. Y. Dept. S.

• POSITIONS VACANT

Wanted Assistant City Engineer. Please send complete resume including salary desired in first letter. Apply to Director of Public Works, New London, Connecticut.

Assistant City Engineer—City of Lockport, New York, invites applications. Must be graduate Civil Engineer, a Professional Engineer, or one who will be qualified to take examination. Salary commensurate with experience and ability, opportunity for increase in salary and advancement, fringe benefits. Contact Commissioner of Public Works, City Hall, Lockport, New York.

Construction Executive. Nationally known construction company seeks topnotch young executives. Opportunities for management of entire division of construction company. Prefers some experience in business management. Individual must be capable of estimating and supervising in fields of highway, heavy and tunnel construction. However, not necessary that his present responsibilities be commensurate with responsibilities of position offered. Ability and youth will be given significant consideration. Both foreign and domestic work. Salary open. Please submit complete personal information and resume of experience. All replies will be held confidential. P-8238, Engineering News-Record.

Three instructors in civil engineering are needed. Salary (B. S. Degree) $4200 for nine months. Allowed to register for one graduate course. May take more graduate work by teaching ¾ time. May do research, teach, or practice during the summer. Apply direct to Department of Civil Engineering, Mississippi State University, State College, Mississippi.

Large national Engineering and Construction Company has opening for high-grade Engineer-Estimator. Must be experienced. All replies held in confidence. Address all inquiries to Box 1209, Cedar Rapids, Iowa.

Position Vacant—Sewer Supt. Give complete experience and qualifications. Salary desired. This is a real opportunity for right person. Profit sharing with chance becoming part owner. Must be of the highest caliber. P-8204, Engineering News-Record.

• POSITIONS WANTED

Supt. Const. 20 yrs. Institutional, Industrial, Commercial Engineer. Anywhere. PW-8072, Engineering News-Record.

(Continued on opposite page)

• POSITIONS WANTED

(Continued from opposite page)

Construction Superintendent or manager qualified, 25 yrs. experience. G.M.C. Lucas, 2225 Wisteria, Sarasota, Fla. RI 79843.

Construction Superintendent & Engineer, Twenty-five years of practical experience on all types of heavy construction, Bridges, Highways, Marine, also Refineries and Stations, clean record and producer, excellent references, available shortly, prefer West coast or Western states location. PW-8161, Engineering News-Record.

Construction Superintendent. General Construction. Twenty-five years experience. References. PW-8169. Engineering News-Record.

Architect-Engineer's manager 22 yrs. exp. handling business getting, contracts, field supervision, closing, age 45 six yrs. with present employer desire change. PW-8120, ·Engineering News-Record.

Registered highway engineer, land surveyor, 35 years experience. Engineer or construction Superintendent, highways, bridges, sewers. PW-8172, Engineering News-Record.

Eng. non-grad., 28, 8 yrs. exp. bus. administration, constr. eng. office & field, estimating, struct. design, $170 min., anywhere. PW-8218, Engineering News-Record.

Mechanical-Engineer Estimator, Age 29, married, qualified in all phases of industrial, commercial & process contracting work, desires connection with progressive mechanical construction firm. Willing & able to accept responsibilities & work. Presently employed as Ass't resident engineer. References & Resume upon request. PW-8234, Engineering New-Record.

Project Manager—P.E. 43, Experienced consulting and construction—bridges, highways, dredging and administration of consultant's office. Speaks Spanish. Desires foreign work with consultant. PW-8237, Engineering News-Record.

Civil-Sanitary Engineer-35-BSCE-MSSE-PE- Spanish descent, now employed, desires to represent Firm or Firms manufacturing Sanitary Engineering equipment which desire sales and/or engineering consultant services for their equipment in the Caribbean and/or Latin America. PW-8243, Engineering News-Record.

Engineer, Struct, overseas, MIT, MS PE, 29 design some supervis. reinf. & prestressed conc. Also consider teaching position. PW-8239, Engineering News-Record.

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• POSITIONS WANTED

Constr. Engineer, PE, BSCE, 32, 10 years divers. experience in steel, chem., and industrial constr. incl. contract supervision, coordination, administration with 2 yrs. plant design. Avail. July 1. Reference and resume on request. Permanent position. Prefer N.J., N.Y., Pa. PW-8242, Engineering News-Record.

Civil Eng.M.Sc. 32, 10 yrs. exp. Designed: Apt; public & indust. bldgs., Power plants; bridges. Desires office or field position. Located N.Y.C., will consider relocation. PW-8208, Engineering News-Record.

Project Manager or Superintendent: Well qualified in Dirt and Excavation. Thruways, Air Ports and Roads of any kind. Have References. Am available now. PW-8205, Engineering News-Record.

Prestress Concrete Engineer—6 years experience sales, production, estimating and design in both pre and post-tension work. PW-8207, Engineering News-Record.

Construction Man—12 yrs. Supervisory experience. General Construction. Middle Atlantic States. PW-8228, Engineering News-Record.

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Not in the highway field! It's up 12% Over 1957. AND the new 1958 Highway Bill calls for $400-million *additional* that MUST be spent according to the law by Dec. 1, 1958. *But you must have all the facts all the time.* Our service (now in its second year) includes:

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—All for $35, One Year—

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Model 2000 & 3000 Fairleads. Also Dragline Attachment for Model 3000.
ANDERSON EQUIPMENT COMPANY
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NORTHWEST Model 80D, 2½ cu. yd. Shovel SN. 17245 w/single stick. Shovel Attach. Model 21 Murphy Diesel Engine, Long crawlers—One owner machine in very good condition..$40,000.

NORTHWEST Model 6, 1½ cu. yd. Shovel-Crane-Dragline SN 13321 w/Model 20 Murphy Diesel Engine, 60 ft. crane-dragline boom, 33" wide pads, Machine 8 years old, in fair condition. (Crawlers poor) ....$23,500.

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LORAIN Model L820K, 2 yd. Comb. Shovel-Crane-Dragline SN 25686, w/D-337 Cat. Diesel Engine, electric starting full air controls, 34" Pads, 70 ft. Boom, 36 ton capacity as Crane. This machine just 4 years old—excellent condition and appearance ....$35,000.

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NORTHWEST Model 25, ¾ yd. Shovel, SN 16275, w/Model 11 Murphy Diesel Engine, spec. ¾ yd tunnel shovel attach. (short boom and dipper stick), 28" Offset Crawlers, New 1954—excellent condition throughout ....$17,500.

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VULCAN AND McKIERNAN-TERRY Steam Pile Hammers and Extractors

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DRexel 1-3930
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~~1—Northw... Dra... 30' Boom Murphy Dies... ....$24,500~~ **SOLD**

1—**Northwest** 41 Crane & Drag W/40' Boom G.M. Diesel Good Condition...................$18,000
If Wanted with Backhoe Add 4,000.

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10 sections—Safety nets, 40' x 55', mesh rope, ½" diameter, frame rope ¾", with mesh openings of 4" x 4".

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10B 3 McKiernan-Terry Pile hammer, with H Beam Pile Helmet
Good Condition Price—$5000.00

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with Pugmill Remixer 1000' pipe and accessories. Excellent condition and reasonably priced.

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Your requirements will be brought promptly to the attention of the equipment dealers advertising in this section. You will receive replies directly from them.

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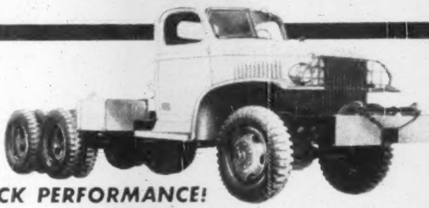
GMC 6x6 NAMED ARMY'S BEST ALL-AROUND TRUCK!



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From Government Storage — these all-wheel-drive GMC 2½ ton 6x6's were specially designed by the U. S. Army to take the roughest terrain in all kinds of weather. These unused 6x6's can do the same job for you in all your truck jobs; whether in a muddy field or along a super highway. Processed—by Memphis Equipment Company—down to the last bolt to assure you of receiving the finest unused GMC 2½ ton 6x6 trucks available today. Parts available anywhere in the nation.

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ARMY TRUCKS • PARTS
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QUARRY AND GRAVEL EQUIPMENT, USED

600 Compressors
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Two (2) used TC-12 Tractors with cable blade and DDPCU. Completely rebuilt and guaranteed. New Transmissions. Less than 400 hours on track. Immediately available for sale or rent. Subject to prior disposition.

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Washington 50 ton elec. Whirley gantry crane.
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Locomotives, diesel, 50, 65, 80, 115 ton.
Dredges, 4 yd. dipper, 16"-20", hydraulic.
Placer dredges, gold, 4½', 6', 8'.
Concrete batching plants, (3).
Derricks, stifflegs, 100 ton, new; 50 ton guy.
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4 truck mixers, without chassis, rebuilt and repainted late 1957

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MERCURY 4-3001, MR. AMBROSE

SHOVELS — DRAGS CRANES DRILLS — EUCLIDS

631 Page Electric Drag, 200', 8 yd.
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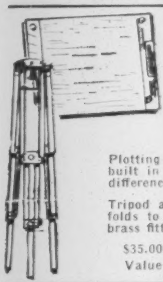

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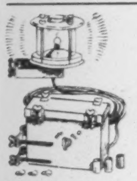
Plotting board is 15" x 12½" with built in trough compass and scale of difference in feet for 1% slope.

Tripod adjusts from 28" to 40" high, folds to 15". Has 4" round head and brass fittings.

$35.00 Value **$14.00** SHIP. CHG. $1.50. EXT.



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Comes complete with batteries, 25" cord, 3 spare bulbs, red, green & clear filters.

GOVT. COST $100.00 Ea. **$13.50** 2 FOR $25.00

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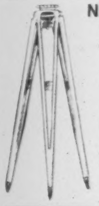
Light is 5½" dia., 5" deep with bracket for mounting on pipe or post. Battery and flasher case 7½" x 7¼" 2 x 3" and has double mounting bracket. Ideal for road blocks, barricades and dangerous areas.



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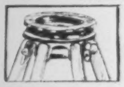
COMP. WITH JOHNSON LEVELING HEAD

Hardwood construction, split leg. Stands 51" high, has all brass fittings. Leveling arrangement consists of 2 spherical segments movable within one and other and 2 locking wing nuts.

REGULAR $80.00 Val. **$11.50** SHIP. CHG. $1.00 EXT. EACH



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Std. 3½" Dia., 8 Thread Head

Hardware, split leg. 60" high with steel shoes.

$50.00 Val. **$13.50** 2 FOR $25.00

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COMP. WITH FITTED LEATHER AND CANVAS CARRYING CASE.

Has Johnson leveling head for std. plane tables, case has carry handle and shoulder straps.

$94.00 Val. **$12.50** Ea. Ship. Chg. $1.00 Ext.

NEW U.S.A. #4745 DIETZGEN DRAWING INK STAND

$5.00 Value **$2.00** P. Post Paid

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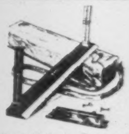

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With 4" Trough Compass. All brass with 10" scale divided 50 parts to the inch. Has attached level and 5½" folding sights and leather case.

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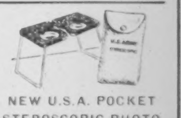

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Has adj. metal frame 1-3/16" dia. lenses 4½" focal length. Fold to 2⅛" x 4½". Comes in leather case. For comparative study of photos, maps, coins, stamps, etc.

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The oldest equip. house in Phila.
Write for bargain circular.

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10,000′ 9″ x 9″ road forms
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*Used four months only

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8″, 10″, 12″, 14″
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STOCKS N. Y.—BOSTON—BUFFALO
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1—3876FT. 700 H.P. & 2—3078FT. 500 HP. PRE2
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25 R-Amer. 75′ Gantry 165′ Boom
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3000 pcs. Beth SP-6a 40′ to 56′--practically new
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Euclid 7-12-15 Yd. Scrapers
A.C. 18 Yd. Scrapers
Tractors D-7, HD19, TD18
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REID-HOLCOMB COMPANY, INC.
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Lorain L 85 Shovel #27779 2½-yard
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Hough Payloader #92682C $6,500.00
Compton 28 Coal Auger #9-856-097F
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CLASSIFIED ADVERTISING INDEX

Albert Pipe & Supply Co., Inc. 238
Ambursen Dam Company 238
Amerlux Steel Products Co. 238
Anderson Equipment Company 238
Associated Pipe & Fitting Co. 238
Automatic Sprinkler Corp. of America . 236

Bollinger-Leland Co., Inc. 236

Conmaco, Inc. 236

Drachman Steel Corp., Hy 238

Foster Co., L. B. 236
Funkhouser Machinery Co. 236

Gargaro Construction Co. 236
Groves Co., C. H. 238

Highway Publishing Co., The 235
Hodge & Hammond Inc. 236

Maccabee Campbell & Assoc. 234
Madison, City of 234
Memphis Equipment Co. 237
Midwest Steel Corporation 238
Mississippi Valley Equipment Co. 238
Moore Lopier 236

Overseas Americans Inc. 234

Penna, Commonwealth of 234

Reid-Holcomb Co., Inc. 236-237-238

Shannon & Co., J. Jacob 237
Smith Co., H. Y. 237
Smith Inc., L. B. 237
Standard Equipment Co. 237
Stanhope Inc., R. C. 238
Swabb Equipment Co., Inc., Frank 237

Telephone Engineering Co. 236

Wagman Pile Company, Inc. 236
Walsh, Perini, Morrison, Kiewit, Utah Companies 238
Whisler Piling Co. 238
Williams Construction Co. 238
Wilson Engineering Corp. 235
Woodbridge Transit Mix Co. 237

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ADVERTISERS IN THIS ISSUE

Acker Drill Co., Inc. 182
AEG Allgemeine Elektricitats 11
Aero Service Corp. 152
Allis Chalmers Mfg. Co. 101
Allis Chalmers Mfg. Co. Tractor Div. 183-186
American Bitumuls & Asphalt Co. 83
American Bridge Div., U.S.S. 176
American Cyanamid 127
American Foreign Insurance Association 138
American Marietta Co. 86
The Asphalt Institute 196-197
Atlas Powder Co. 139
Austin Western Works, Construction Equip. Div., Baldwin-Lima-Hamilton Corp. 92-93
Automotive & Aircraft Div., Amer. Chain & Cable 129

Barber Greene Co. 217
Bausch & Lomb Optical Co. 209
Beech Aircraft Corporation 199
Bell Bottom Foundation Co. 178
Berg, Hedstrom & Co., Inc. 140
Bethlehem Steel Co. 1
Blaw Knox Co.-Construction Equip. Div. 89
Borden Metal Products Co. 36
Bros Incorporated 5

J. I. Case 119
Cast Iron Pipe Research Association 130-131
Caterpillar Tractor Co. 67-70
Celotex Corp. 90
Chicago Bridge & Iron Co. 2nd cov
Clipper Mfg. Co. 137
Contractors Service Ltd. 210
Commercial Shearing & Stamping Co. 165

D-A Lubricant Company, Inc. 162
Danuser Machine Co. 163
The Deming Co. 195
Durajoint Technical Information 65

Earle Gear & Machine Co. 195
Elgood Equipment Corp. 190
Ellicott Machine Corp. 91
Erie Strayer Company 223
Expansion Joint Institute 191

Fairbanks Morse & Co. 124, 158
Fate Root Heath Co. 2
Fennel Instrument Corp. of Amer. 87
L. B. Foster Co. 49
Fruehauf Trailer Company 73

Gahagan Dredging Corp. 163
Gardner-Denver Company 174-175
General Textile Mills, Inc. 125
General Tire & Rubber Co. 15
Goodall Rubber Co. 12
W. E. Grace Mfg. Co. 126
M. Greenberg's Sons 168
Griffin Wellpoint Corp. 204
Gulf Oil Corp. 142-143

Haloid Xerox, Inc. 77
Hamilton Kent Mfg. Co. 220
Hammond Iron Works 76
E. L. Hardin Associates, Inc. 216
Harnischfeger Corp. 20
Hartford Fire Insurance Company Group 173
B. M. Heede, Inc. 202
Hercules Motors Corporation 16-17
Hercules Powder Company 192
A. C. Horn Div., Sun Chemical Corp. 180, 182
Frank G. Hough Co. 14
Hughes Bros. 204

Ideal Cement Co. 181
Intercontinental Equipment Co. 170
International Harvester Co. (Constr.) 121-123
Irving Subway Grating Co. 82
Irvington Form & Tank Corp. 229

Jay Company 9
Johns Manville Corp. 208
Johnston Pump Co. 164

Kaiser Aluminum & Chemical Corp. 46
Kinnear Mfg. Co. 154

Laclede Steel Company 85
Larsen Products Corp. 88
Leschen Wire Rope Div., H. K. Porter Co., Inc. 99
LeTourneau Westinghouse Co. 147-150
Lipe Rollway Corp. 201
Lock Joint Pipe Co. 18
Louisville Cement Co. 226
Lufkin Rule Company 164

Mack Trucks, Inc. 56-57
Macomber, Inc. 4
Maginniss Power Tool Co. 158
R. C. Mahon Co. 206-207
Marcel Loeb Co. 202
Marion Power Shovel Company 203
Massey-Ferguson, Inc. Indus. Div. 144
McGraw-Hill Book Co. 151
McKiernan Terry Corp. 80
McKinney Drilling Co. 190
W. R. Meadows, Inc. 118
Merriman Brothers, Inc. 170
Mississippi Glass Co. 13
Mississippi Valley Equip. Co. of St. Louis 45
Mobile Drilling, Inc. 33-34
Monroe Calculating Machine Co., Inc. 157
Monsanto Chemical Co. 41
Moretrench Corp. 30-31
Morris Machine Works 159

National Lead Company 211-212
National Tube Div., U. S. Steel Corp. 215
Noble Co. 78-79

Owen Bucket Company 55

Patent Scaffolding Co. 189
Penn Metal Company, Inc. 166
Permacrete Products Corp. 178
Pittsburgh Des Moines Steel Co. 116
Precision Instruments, Inc. 95
Proto Tools 128

Ramset Fasteners, Inc. 117
Raymond International 8
Read-Standard Div. 59
Reda Pump Company 200
Ric Wil Co. 155
Russell, Burdsall & Ward Bolt & Nut Co. 205

Sauerman Bros., Inc. 35
Servicised Prod. Corp. 187
Sheffield Corp. Div. Armco Steel Corp. 225
Sika Chemical Corp. 84
Socony Mobil Oil Co., Inc. 132
Spanall of the Americas, Inc. 6-7
Sprague & Henwood, Inc. 97
Spencer, White & Prentis, Inc. 177
Stacor Equipment Co. 172
J. S. Staedtler Co. 156
Standard Steel Corp. 179
John W. Stang Corp. 171
Stran Steel Corp. Div., National Steel Corp. 81
Superior Lidgerwood-Mundy Corp. 190
Swiss Fabricating, Inc. 43
Symons Clamp & Mfg. Co. 135, 136

Thew Shovel Co. 134
Thompson Pipe & Steel Company 172
Timken Roller Bearing Co. 4th cov
Torrington Co. 153
Tractor Spreader Co. 168
Travelers Ins. Co. 3rd cov

Underpinning & Foundation Co., Inc. 180
Unit Crane and Shovel Corp. 50-51
U. S. Rubber Co. (Tire & Mechanical) 22, 169
U. S. Steel Corp. 103-114; 160-161
U. S. Steel Supply Div., U.S.S. 218
United Steel Fabricators 10
Universal Form Clamp Co. 74
Universal Sewer Pipe Corp. 3

Water Seals, Inc. 75
Wedge-Lock Clay Pipe Manufacturers 141
Whitehead Stamping Co. 178
Wincharger Corporation 177

Professional Services 239-242

CLASSIFIED ADVERTISING

F. J. Eberle, Business Mgr.

Employment Opportunities 234-235
BusinessOpportunities 235
Special Services 235
Educational 235
Notices
Proposals 239-241
Equipment
(Used or Surplus)
(For Rent, Sales Wanted) 235-238
Advertisers Index 242

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Congratulations Are in Order

HAIL TO THOSE who have given the nation's roadbuilding program its present impressive momentum! Setting roadbuilding afire, they have kindled a bright spot, one of the brightest, in the nation's economy. They have helped push the construction industry out of its slump. They are doing in the grand manner that inspiring work of the engineer, turning ideas into things.

Credit goes not alone to engineers, though highways are so typical of engineered construction. Credit goes as well to those who have legislated and financed; consulted and negotiated; supplied and equipped; supervised and labored to bring the work of designers and contractors so prominently to fruition in this early phase of the big road program. Roadbuilding, as set forth in this issue, is rolling. Truly, here is the construction industry brilliantly at work in all its elements.

Electronic Challenges

"OSCAR" AND ELECTRONIC BIDDING present challenges in this issue that the highway segment of the construction industry should accept eagerly.

"Oscar," as AUSCOR is pronounced, provides the means of attaining a highway design process that is completely mechanized, except for engineering judgment and some inevitable drafting (which even now is prey for electronic wizardry). We already have aerial photography, the tellurometer and the geodimeter, the stereoplotter, the electronic computer, the continuous line plotter and automatic linkages from one to the other in the case of the last three devices.

The bottleneck is the stereoplotter. But now, if AUSCOR's potential as substitute for the plotter operator can be realized (p. 23), an amazing amount of terrain data can be gathered from aerial photos in but a fraction of the time required at present.

Existing mechanical and electronic highway design tools are producing earthwork savings of 5 to 10% in non-urban areas, according to highway agencies. By enabling trial of an unlimited number of alignments and grades, AUSCOR should be able to squeeze out the saving of a couple more percentage points. And in the design process, AUSCOR's speed should save time.

As to electronic bidding, ENR's Business News Manager, Miss Elsie Eaves, points the way toward utilizing high speed data processing equipment for a broad range of possibilities: Bidding, estimating, figuring indexes, recording prices and paying contractors (p. 71). How computers can be used for such cost accounting and analysis is only hinted at in her article; the computer experts tell us that adapting the hardware—including systems employing input and output other than punched cards—is not much of a problem.

The challenge implicit in Miss Eaves' article is for states to set up uniform coding systems for bid items. If set up nationally the benefits would be truly exciting.

Roadbuilders already can take pride in their ready adoption of the many modern tools made available in recent years, both in office and field. There is reason for confidence in their ability to master the latest challenges.

Let's Not Legislate Uniformity

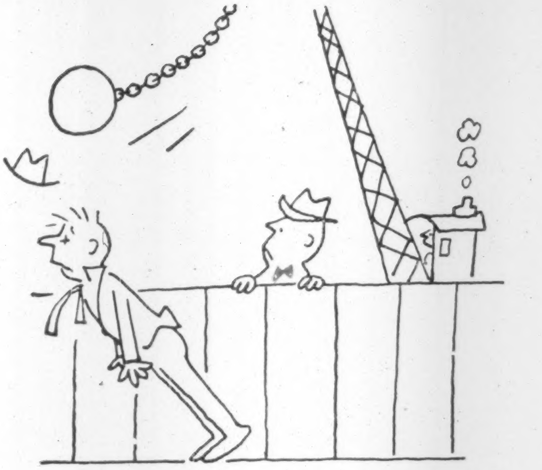
THE INTERSTATE SYSTEM OF HIGHWAYS is unquestionably going to demand a greater degree of uniformity in planning, design and operational practices among the state highway departments than has been the case heretofore. Depending on how this uniformity is achieved, it can be a constructive or an inhibiting development to highway progress. It is vitally important that it be constructive, and state highway officials can help make it so.

This was the timely theme of an address by A. E. Johnson, executive-secretary of the American Association of State Highway Officials, before a western highway group two weeks ago (ENR June 12, p. 30). It is Mr. Johnson's contention that unless the states take positive action to develop uniform practices voluntarily, the federal government might legislate on the matter, which could readily place highway development in a straight jacket. Design by statute can never be a substitute for design by engineering judgment.

Fortunately, the machinery to achieve uniform highway practices in an orderly and progressive manner already exists. It resides in AASHO and the Federal Bureau of Public Roads, operating cooperatively in the democratic way that has produced the good road system that we already have. By bringing together the ideas of the state highway departments and refining them in committee studies and reports AASHO has been able to marshall better facts than any single set of experts could possibly do. By serving as a catalyst in assembling these facts into design standards and practices, acceptable to all, the BPR has assured a type of uniformity that has been flexible enough to meet the changing needs.

The need for freedom in the exercise of engineering judgment will be greater in the future that it has been in the past. The much greater reliance now being placed on facts produced by research demands that engineering judgment rather than legal dictums determine basic highway practices.

All this means that the state highway departments must take the lead in bringing about the type of uniformity that will satisfy the public and yet be amenable to change as new facts are developed. This may require more cooperation—more give and take—than some highway officials are used to. But the alternative could be more complete federal control by law, which is no way to develop a highway system.



1.

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A twenty-story building! I should make a tidy sum."
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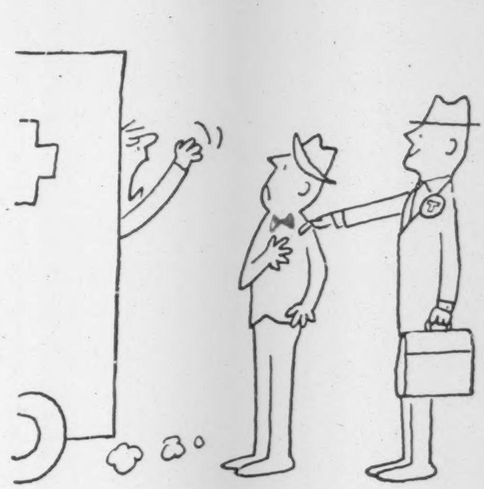

2.

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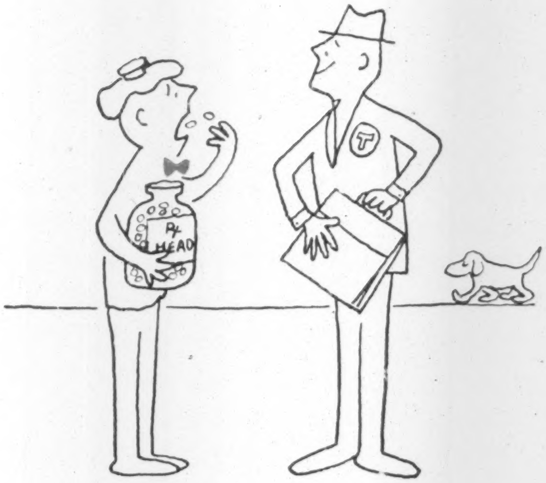

3.

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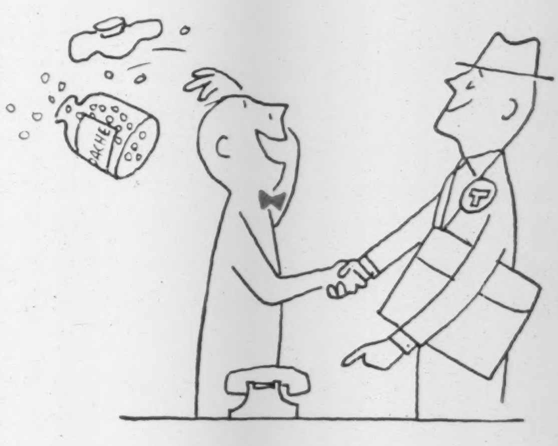

4.

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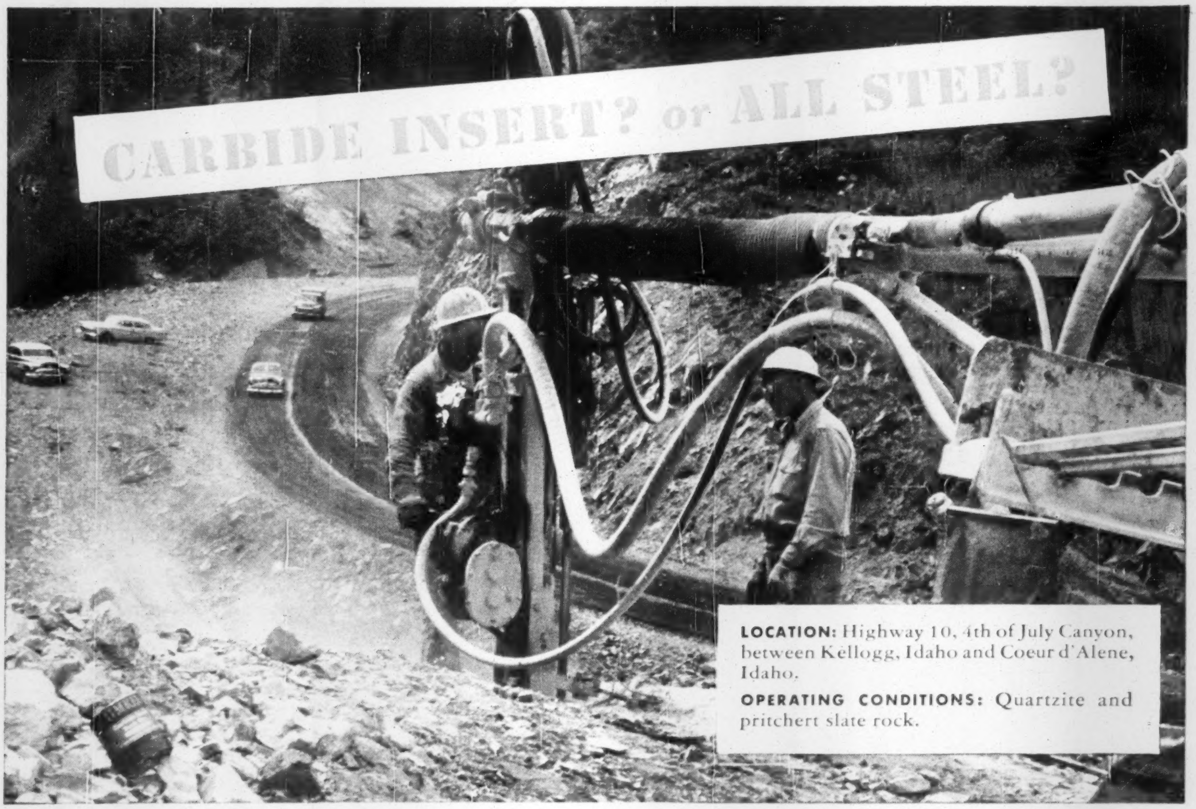
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